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# **Chronology of KSC and KSC Related Events for 1976**

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## **FOREWORD**

Much of the activity at the Kennedy Space Center in 1976, particularly during the first 9 months, centered on the planning, construction, maintenance, and operation of the U.S. Bicentennial Exposition on Science and Technology. Since this project began in 1975, the historian has included some dates of key events relating to the Exposition to introduce the 1976 Chronology. Also in 1975 A 3-year program was initiated at KSC to research the electrical characteristics of thunderstorms. This is an international program involving top atmospheric researchers of the free world.

**Frank E. Jarrett  
Historian**

January 1975

**January 16:** During an interview with representatives of the New York Times, President Gerald R. Ford expressed his opinion that a Science and Technology display at Cape Canaveral was a good idea. (Memo for the President from Theodore C. Marrs, Subject: Bicentennial Science and Technology Display at Cape Canaveral, Florida, dated July 24, 1975.)

June 1975

**June 24:** Mr. John R. Stiles, a member of President Ford's White House Staff, and General Durward L. Crow, NASA, Deputy Associate Administrator, visited the Kennedy Space Center to investigate the possibility of holding a national exhibition on science and technology during the summer of 1976. (Report: Bicentennial Exposition on Science and Technology Facilities, prepared by Paul Gauger, Project Engineer, John F. Kennedy Space Center, NASA, dated September 3, 1976. Hereinafter cited as the Gauger Report. Also, staff notes from meeting held on June 21, 1975.)

July 1975

**July 10:** A preliminary concept of a U.S. Bicentennial Exposition on Science and Technology was prepared by John R. Stiles. His concept outlined proposed themes, exhibitors, display locations, and display structure. He estimated the costs for the exhibition at \$2,800,000. (Gauger report, Tab A-11.)

**July 24:** In a memorandum for the President, Theodore C. Marrs, Special Assistant to the President, requested a decision be made to approve or disapprove a bicentennial exhibition at Kennedy Space Center. Mars recommended that, if the President approved the project, NASA should be given the management responsibility. (Memorandum for the President from Theodore C. Mars, Subject: Bicentennial Science and Technology Display at Kennedy Space Center, Cape Canaveral, Florida, dated July 24, 1975.)

**August 1975**

**August 5:** NASA submitted a Bicentennial Plan to the Office of Management and Budget to forward to the President. General Crow, NASA Headquarters, was designated as NASA's Bicentennial Project Manager. (Minutes of Policy Staff Meeting, dated August 4, 1975.)

**August 7:** Mr. Lee Scherer, KSC's Center Director, called a meeting of Design Engineering, Technical Support, Public Affairs, and Procurement representatives to discuss the Bicentennial. Mr. Scherer had received word from NASA Headquarters that the President had approved plans to hold the exposition at KSC between June and September 1976. (Memo from EX/Chief, Executive Staff to distribution, Subject: Bicentennial, dated August 7, 1975.)

**August 15:** Mr. Lee Scherer, KSC's Center Director, announced the appointment of Mr. Paul Donnelly, Associate Director for Operations, Launch Operations, as Project Manager for the Bicentennial Exposition. As Project Manager, he was to serve as the focal point for all activities in the development of the Center as the site for the U.S. Bicentennial Exposition of Science and Technology. (John F. Kennedy Space Center, NASA, Announcement. Subject: Mr. Paul C. Donnelly Named Project Manager, Bicentennial Exposition, dated April 15, 1975.)

**September 1975**

**September 23:** An implementation plan for the Bicentennial Exposition was prepared by Paul Gauger, project engineer for the exposition. The plan included: (1) a master plan for the Vehicle Assembly Building area, the site selected for the exposition, (2) a master plan for the Visitors Information Center, (3) budget cost estimates, and (4) a facility design and construction schedule. The plan called for the use of air-conditioned geodesic domes to house the exposition displays. The domes were to be erected on the three main parking lots adjacent to the VAB. At the VIC, the plan called for extending the bus-loading dock, providing an additional 900 parking spaces, and erecting a new 10,000 square-foot exhibit building. Costs were estimated to be \$3 million. (Implementation Plan, U.S. Bicentennial Science and Technology Exposition, Kennedy Space Center, Florida, dated September 23, 1975.)

**October 1975**

**October 2:** Mr. Ed Simmons, of the Department of Commerce, was appointed Commissioner General for the Bicentennial Exhibition. Mr. Simmons was loaned to NASA for approximately 1 year to direct the planning and operations of the Bicentennial Exposition. Clapp & Poliak, a management support consulting firm of New York, was hired by NASA to support Mr. Simmons in the Bicentennial Exhibition planning effort. (Weekly Notes, Donnelly (P.C.) November 6, 1975.)

**October 16:** The erection of the first geodesic dome was completed. This dome was to serve as a prototype model to show potential exhibitions. It was leased by TWA Services for KSC. Subsequent domes were leased by the KSC Procurement Office.

**October 23:** General Crow, NASA Headquarters, hosted representatives of 20 other government agencies on a tour of KSC. Letters had been sent from the White House to the heads of government agencies inviting them to send representatives to KSC. Each agency was also instructed to notify the White House of their plans to participate in the exposition.

**November 1975**

**November 7:** NASA received a \$3,000,000 grant from the Department of Commerce for the construction and maintenance of the Bicentennial Exposition. The money was made available under the Title 10 "Job Opportunities Program" of the Public Works and Economic Development Act. Under the provisions of allocation, NASA became a contractor of the Department of Commerce. (Standard Form 26 Award/Contract, Contract No. 6-36359, signed by Fredrick D. Hobbs for the Department of Commerce (11-7-75) and by R. H. Curtin, Code BX, (NASA HQS) on November 12, 1975.)

December 1975

December 3: The Center Director approved a recommended lightning program that included a proposal to invite thunderstorm investigators to come to KSC for a 3-year study program to investigate the electrical properties of thunderstorms. KSC would offer its facilities to the scientific community for studies in their fields of research for a 2-month period of their choice during the summers of 1976, 1977, and 1978. The investigators would be self-funded and would set up their own program organization. KSC would establish rules on safety, security, and available support resources, but would not exercise approval or disapproval of individual projects otherwise. KSC would be host, but would not "run" the program. The concept is that many expert investigators conducting their research at the same locality on the same storms would cross-fertilize each other, and the results would far exceed those that would come out of isolated, separate research studies. (Ref: Exec Comm #697 of 12/8/75.)

December 10: At the fall meeting of the American Geophysical Union in San Francisco, W.R. Durrett, Chairman of the KSC Lightning Study Team, extended KSC's invitation to the scientific community. Dr. Martin Uman of the University of Florida, Chairman of the Joint Atmospheric Electricity Subcommittees of the American Geophysical Union and the American Meteorological Society, accepted the invitation. A secretariat was named, made up of Dr. E. T. Pierce, National Severe Storms Laboratory of NOAA, Norman, Oklahoma; and Dr. Lothe S. Ruhnke, Naval Research Laboratory, Anacostia, D.C. The period from June 15 to August 15, 1976, was selected as the research time. (Ref: Letter from Secretariat to prospective investigators of December 15, 1975.)

January 1976

**January 2:** Heavy patronage of the guided bus tours at Kennedy Space Center during December brought the total for 1975 to 1,168,189. This marked the third busiest year since the public tours were initiated in 1966. In the record year, 1972, the number of bus tour patrons exceeded 1,300,000; and in 1973, more than 1,200,000 people utilized the bus tour service. An even greater patronage is anticipated in 1976, the Bicentennial year. (KSC News Release: KSC 1-76, January 2, 1976.)

**January 8:** KSC announced the awarding of a \$939,800 contract to the Holloway Corporation, Titusville, Florida. The contract covers modifications to LC-39's Launch Control Center to accommodate the installation of the Space Shuttle Launch Processing System. Holloway was awarded the contract December 11, 1975. (KSC News Release: KSC 4-76, January 8, 1976.)

**January 9:** Contract NAS 10-8935 in the amount of \$89,695 was awarded to David A. Boland (Boland Construction Corporation, Titusville, Florida). The contract is for the construction of the geodesic domes which will house the displays at the Bicentennial Exposition on Science and Technology. (KSC News Release: KSC 5-76, John F. Kennedy Space Center, dated January 9, 1976.)

- o Fourteen KSC employees received NASA Group achievement awards recognizing their technical expertise and their contributions to international space cooperation. The group was honored for its work on Helios A, first of two solar probes to be launched from Cape Canaveral. Helios is a joint project of the United States and West Germany. Gilbert W. Ousley, U.S. Project Manager representing Dr. James C. Fletcher, presented the awards to Ray Hunter, Martin Marietta; Bill Phillips, Convair Division, General Dynamics; Nancy Pierce, Tommie Knight, Don Sheppard, John Gossett, Jim Weir, John Neilon, Floyd Currington, Terry Terhune, Skip Mackey, Jack Baltar, Larry Kruse, and John Zeman of KSC's Expendable Vehicles Directorate. Ants Kutzer, the West German Helios Project Manager, was present for the ceremony. (Spaceport News: Volume 15, No. 6, John F. Kennedy Space Center, dated March 18, 1976.)

**January 12:** TWA Services, Inc., Kennedy Space Center's concessionaire for NASA KSC tours and for operation of the KSC's Visitors Information Center, was selected to provide facilities for the Bicentennial Exposition at KSC. The TWA Services, Inc., contract was modified to include \$2,492,000 for this purpose. (NASA Contract NAS-10-8940, dated January 12, 1976.)

**January 15:** Helios 2, the second of two Helios spacecraft, was successfully launched by a Titan III E - Centaur launch vehicle from LC-41 of the Eastern Test Range. The objective was to place the Helios in solar orbit as close to the sun as present technology would allow. Its mission was to investigate solar processes and solar-earth relationships by acquiring data on solar winds, magnetic and electrical fields, cosmic rays, and cosmic dust. The spacecraft carried 10 experiments, 7 of which were German. (Field Report, Titan/Centaur 5, Helios 2, TR-1447, prepared by Centaur Operations Division, KSC-EV, dated June 30, 1976.)

- o With the Bicentennial Exposition implementation and financial plans completed and approved, Mr. Ed Simmons resigned his position as Bicentennial General Manager and returned to his duties with the Department of Commerce. Although NASA HQS was to continue with the overall responsibility for managing the exposition, the responsibility for its construction, operation, and maintenance was shifted to the John F. Kennedy Space Center. (NASA News, Release No. KSC 13-76, dated January 20, 1976; Notes, Donnelly, January 15, 1976.)

**January 16:** TWA Services, Inc., awarded two contracts for the construction of Bicentennial Exposition facilities. A \$146,300 contract for outfitting pavilions went to K&S Electric, Inc. of Titusville, Florida. A second contract for \$254,350 was awarded to Marinoff Construction Co. of Cocoa Beach, Florida, for the construction of 10,000 square-foot exhibit building to be located at the Visitors Information Center. (NASA News, Release No. KSC 12-76, dated January 16, 1976.)

**January 17:** CTS (Communications Technology Satellite) was successfully launched into a transfer orbit by Delta 119 from Pad B of Launch Complex 17 at the Eastern Test Range. NASA's responsibility for the launch phase was completed on January 29, 1976, when the spacecraft was maneuvered to a near-geostationary orbit at 116 degrees West Longitude above the Pacific Ocean. CTS is a joint program of Canada and the United States. The spacecraft was built by the Canadian Department of Communication at the Canadian Communications Research Center, Ottawa, Canada. NASA provided the Transmitter Experiment Package developed by NASA at the Lewis Research Center, Cleveland, Ohio. NASA also provided for spacecraft checkout, the launch vehicle, and launch services.

The Transmitter Experiment Package carried aboard the satellite consists of a traveling wave tube and its associated processes which convert solar array power into power to operate the traveling wave tube. Transmission power levels are expected to be 10 to 20 times higher than communication satellites now in use. As a result, smaller and less expensive ground equipment can be used to receive satellite transmission. The CTS carries experiments in the fields of education, health care, community and special services, and technology utilization. (TR-1411, Delta-119, Communications Technology Satellite (CTS) Flight Report, prepared by Delta operations Division, Expendable Vehicles Directorate, John F. Kennedy Space Center, dated March 26, 1976; Mission Operations Report No. E-610-76-01, dated February 13, 1976.)

**January 18:** Sunday public drive-through tours of the Cape Canaveral Air Force Station and the Kennedy Space Center were resumed. The tours had been discontinued since August 17, 1975, as a result of picketing by members of the Hotel and Restaurant Employees International Union. Picketing was halted on January 10, 1976, at the instigation of the National Labor Relations Board. (KSC News Release: KSC 8-76, dated January 13, 1976, Notes to CD/Director from Gooch - January 14, 1976.)

**January 29:** Intelsat IVA F-2, the second of the Intelsat IVA series, was successfully launched by an Atlas-Centaur (AC-37) and placed in the desired transfer orbit. The Intelsat IVA F-2 will serve as a back-up for Intelsat IVA, F-1, launched for the Communications Satellite Corporation on September 25, 1975. (Mission Operations Report No. E-491-633-76-02, dated February 25, 1976.)

**January 30:** Mr. Angelo Taiani, of the Technical Services Directorate, was named as project coordinator for the 1976 Thunderstorm Research International Program (TRIP 76) at KSC. (Ref: TS letter of 1/30/76.)

**During January:** The General Accounting Office (GAO) announced that its report on the pace of development of the space Shuttle will be sent to the Congress within a month. The 1976 report will take the basic

areas discussed in GAO's 1975 report as follow-up to show how NASA's actions during the 1-year period have confirmed or dispelled earlier GAO observations. Specific areas of the GAO 1976 report will cover among other items:

**Environmental:** The results of NASA's studies of the possible effects on the solid rocket boosters on the upper atmosphere.

**Range Safety:** External tank destruct system in case of launch failure.

**Crew Compartment:** Mating of the first cockpit to the Orbiter spacecraft.

**Marshall Engine Test:** The success in 100 ignition and shutdown cycles of a 42,000-lb thrust test engine at MSFC.

**Avionics:** The results of the activation of the first flight-type computer system at Johnson Space Center.

**Software:** The results of a "software scrub" effort to reduce the amounts of software developed for flight operations. (Aviation Week and Space Technology, Volume 104, No. 2, pages 17 and 18, January 12, 1976.)

- o NASA's budget request to Congress for fiscal year 1977 placed increased emphasis on aeronautics and a stretch-out in the production and refurbishment schedules of two space Shuttle orbiters. A substantial reduction of jobs in FY 77 will result from budget constraints and the realignment of roles and missions.

Although the \$3.697 billion request is \$142 million above the FY 76 appropriation, it is \$200 million less than the amount NASA had expected to receive. OMB trimmed \$182 million from the request. The cuts will delay the production of a third orbiter, and will result in cancellation of the Mariner-Jupiter/Uranus missions, the large space telescope, and the Pioneer-Jupiter/Probe mission. In addition, NASA civil service jobs will be reduced by 500, contractor support will be reduced by 667, JPL will be cut 455 positions, and an additional 3000 to 4000 contractor personnel will be impacted in many ways. (Aviation Week and Space Technology, Vol. 104, No. 4, Pages 30 & 31, January 26, 1976.)

**February 1976**

**February 1:** A contract, in the amount of \$75,000 with an \$8,000 supplement, for study of the application of thermal and infrared imagery in the development of an effective freeze prediction model, originally awarded the University of Florida's Institute of Food and Agricultural Sciences by NASA/KSC in 1973 and renewed in 1974, has been extended again. Freeze prediction research is directed toward development of a computerized system dependent upon thermal scanning and infrared imagery from spacecraft and aircraft. It is considered of great importance to Florida citrus growers, as well as truck farmers and other agricultural interests in all areas where freeze conditions occasionally occur. In connection with the study, all thermal data are brought by the researchers to KSC for analysis in its Earth Resources Data Analysis Facility, after which they are taken to the University of Florida and National Oceanic and Atmospheric Administration (NOAA) facilities for predictive model development. (NASA Activities, Vol. 7, No. 2, dated February, 1976.)

**February 2:** NASA tours volume in January 1976 exceeded the January 1975 tour volume by 11.1 percent. A total of 82,494 patrons purchased tickets for the tour of KSC and Cape Canaveral facilities. Visitors Information Center facilities are being expanded in anticipation of a million or more visitors expected to attend the Bicentennial Exposition. Work is almost completed on a new food services facility, and construction of a new exhibit building got under way in January. (NASA News, Release No. 38-76, dated February 2, 1976.)

**February 6:** A KSC Task Group was appointed to manage and direct the planning, construction, and operation of the Bicentennial Exposition. Mr. Miles Ross, KSC Deputy Director, headed the group. Mr. Paul Donnelly and Mr. Jack Gerdig were assigned to direct site development and operations; Mr. Joseph Malaga, Management Operations; Mr. Charles Hollinshead, Public Affairs; and Mr. Jerry Storey (NASA HQS), headed the industry and Intra-government Coordination Office. (Bicentennial Exposition Status Report to NASA HQS from CD/Director, dated February 6, 1976.)

**February 9:** NASA signed a contract with Charter Industries of Raleigh, North Carolina, for the lease of 14 additional geodesic domes to house the displays at the Bicentennial Exposition. Negotiations leading to the \$476,419 contract were begun in October 1975. The lengthy negotiations resulted in part from the lack of firm commitments from industry and government exhibitors as to their exhibition requirements. (Gauger Report; NASA Contract NAS 10-8915, dated February 9, 1976.)

February 10: Center Director, Lee R. Scherer, announced a major reorganization of KSC's organizational structure in preparation for the Space Shuttle operations.

Eliminated in the realignment were the Installation Support Directorate and the Safety Office, with functions of those organizations reassigned.

Dr. Walter J. Kapryan, Director of Launch Operations since 1969, was named Director of Space Vehicle Operations in a move to restructure the Apollo/Saturn launch organization for Space Shuttle operations. John J. Williams, Director, Spacecraft Operations in the Launch Operations Directorate since 1964, was named Kapryan's deputy.

Reporting to Kapryan will be Directors for Space Transportation System (STS) Processing, Shuttle Engineering, Shuttle Payloads, and Expendable Vehicles, formerly Unmanned Launch Operations.

Paul C. Donnelly, formerly Associate Director for Operations, Launch Operations, was appointed Director, STS Processing. George T. Sasseen, formerly Chief, Engineering Division, Spacecraft Operations, was appointed Director, Shuttle Engineering. Isom A. Rigell, formerly Director, Launch Vehicle Operations, Launch Operations, was appointed Director, Shuttle Payloads.

George F. Page, who was appointed Director, Unmanned Launch Operations in October 1975, has been designated Director, Expendable Vehicles.

Joseph F. Malaga, who was appointed Director of Administration in 1975, was appointed Director of Administration and Management Operations.

The Administration and Management Operations Directorate will retain the personnel, procurement, industrial and management engineering, space utilization, manpower, resources, and financial management functions formerly assigned to the Administration Directorate and incorporate many functions formerly assigned to Installation Support and Center Resources Planning and Control.

Reporting to the Director of Administration and Management Operations will be the Director for Administrative Operations and Support Services and the Director for Procurement, Supply, and Transportation.

Named as Director, Administrative Operations and Support Services was Robert G. Long, formerly Chief, Center Resources Planning and Control. Functions assigned to the new directorate include management systems, resources and accounting systems, personnel, and financial management (formerly Administrative functions); printing and reproduction, mail, library, graphics, publications, and custodial services and grounds management (formerly Installation Support activities); and former Center Resources Planning and Control functions.

The Procurement, Supply, and Transportation Directorate, headed by William M. Lohse, former Chief of the Administration Directorate's Procurement Office, incorporates former Installation Support functions of supply and transportation. The Labor Relations and Procurement functions were also assigned to the directorate.

Appointed Director, Safety, Reliability & Quality Assurance, and Protective Services was John R. Atkins, former Director, Safety Office. The new organization will incorporate functions of the former Safety Office, the former Reliability and Quality Assurance Directorate, and Security and Fire and Rescue Services, formerly functions of Installation Support.

The Technical Supply Directorate, headed by Peter A. Minderman, will assume most functions in Installation Support's Plant Engineering and Maintenance Division, including power coordination, utilities, engineering and operations, maintenance engineering, and test support management, plus photographic operations. John J. Neilon is Deputy Director of Technical Support.

John P. Claybourne was appointed Manager of the Sciences, Technology, and Applications Office, retaining responsibilities formerly assigned to him in the now deactivated Sciences Applications, Skylab, and ASTP Programs Office.

The Design Engineering Directorate, headed by Raymond L. Clark, and the Shuttle Projects Office under Dr. Robert H. Gray were not affected by the reorganization. (NASA News, Release No. KSC 37-76, dated February 10, 1976.)

**February 11:** NASA announced the extension of The Boeing Aircraft Company's support services contract with KSC. The \$6,855,000 award extends the current contract from February 1 through May 31, 1976. Boeing will continue to provide test support management, plant engineering and maintenance, supply and transportation operations, documentation, fire prevention, protection and rescue services, quality assurance and training support, and security services under the terms of the extension agreement. The total contract amount since it became effective in March 1971 is \$126,530,452. (NASA News, Release No. 34-76, dated February 11, 1976.)

- o A 1-year extension of a contract for custodial services at KSC was awarded to Expedient Services, Inc., of Titusville, Florida. The \$1,-974,951 contract covers the period from February 1, 1976, through January 31, 1977. The cost-plus, fixed-fee contract is a small business award set-aside for disadvantaged firms. (NASA News, Release No. 40-76, dated February 11, 1976.)
- o Eight members of the Kennedy Space Center's Delta Launch team (Expendable Vehicles Directorate) were awarded medals by NASA Administrator, Dr. James C. Fletcher. The Delta government-contractor launch team received the NASA Group Achievement award.

The Distinguished Service Medal, NASA's highest award, was presented to John J. Neilon who served as Director, Unmanned Launch Operations from 1970 to 1975. He is now Deputy Director of Technical Support.

Exceptional Service Medals were presented to Wayne R. McCall, Delta Launch Operations Division; Arthur J. Mackey, Spacecraft and Support Operations Division, Unmanned Launch Operations; Mason R. Comer, Special Assistant to the Director of Unmanned Launch Operations; James E. Towles, Project Engineering Office, Design Engineering Directorate; James C. Sweat, Safety Office, Range Operations Branch, Unmanned Launch Operations; Henry J. Van Goey, Chief, Western Launch Operations Division, Unmanned Launch Operations; and Richard B. Umlauf, Chief, Resources Requirements Branch, Technical Support. (NASA News, Release No. 55-76, dated February 11, 1976.)

**February 13:** A 2-day conference was held at KSC on February 11 and 12 to describe to potential Bicentennial exhibitors the facilities, services, and public affairs support they might expect from KSC, and to receive exhibitor's requirements. The 2-day meeting was attended by representatives from 41 Federal agencies, 16 from Industry, 8 from NASA HQS, and 10 from other agencies. (Bicentennial Weekly Status Report to NASA HQS from CD/Director, dated February 13, 1976.)

**February 19:** Marisat 1, the first in a series of three maritime communications satellites, was successfully launched on board a Delta launch vehicle (Delta 120) from Pad 17B, Cape Canaveral. The Marisat spacecraft was designed to transmit voice, data facsimile, and telex messages to and from ships at sea through special land stations located at Southberry, Conn. and Santa Paula, Calif. These land stations are in turn interconnected with domestic land networks. The launch support for this mission was provided by NASA on a fully reimbursable basis by Comsat General Corporation, a subsidiary of the Communications Satellite Corporation.

The satellite, a spin-stabilized actual repeater communications spacecraft, is to be placed in a synchronous, circular, equatorial orbit over the Atlantic Ocean. It will provide continuous real-time communications between ships and shore data acquisition facilities through three UHF channels and two L and C band channels. The UHF channels initially will be under lease to the U.S. Government using its own data acquisition facilities. The L and C band channels will be available to commercial shipping with communications transmitted to and from Comsat's land-based facilities. (Mission Operations Report, M-492-205-76-01, dated January 26, 1976; TR-1413, Delta 120, Maritime Communications Satellite (Marisat 1), Delta Operations Division, John F. Kennedy Space Center, dated April 9, 1976.)

**February 20:** NASA and TWAS signed a formal contract providing for TWAS to manage the construction of the Bicentennial Exposition. The contract definitized the provisions of a letter contract awarded TWAS on January 12. Under the terms of the contract, TWAS will manage site preparations and will award subcontracts for construction of buildings, parking areas and other facilities, installation of utilities, and for dismantling operations at the close of the exposition. (NASA News, Release No. KSC 110-76, dated March 25, 1976; and NASA Contract No. NAS 10-8940, dated 1-12-76.)

**February 21:** Marisat 1, launched February 19 into a transfer orbit with an apogee of 36,736 km and a perigee of 184.5 km (the expected apogee was 36,978 km and the perigee 185.2 km), was boosted into its synchronous equatorial orbit on February 21. The spacecraft was maneuvered to a position approximately 15 degrees West Longitude above the equator. (Mission Operations Report NO. M-492-205-76-01, dated April 13, 1976.)

**February 27:** NASA announced its intentions to extend a number of its major support contracts. These contracts held by Federal Electric Corporation, Bendix Corporation, and the Boeing Aircraft Company are due to expire in the near future but will be extended for an

indefinite time, probably until early 1977. The extensions are necessary in order to provide NASA time to complete studies of the contract structures considered most feasible and economical to meet Shuttle Program requirements. Recompetition of The Communications and Instrumentation Support Services Contract, being performed by Federal Electric Corporation, was initiated through issuance of a Request For Proposal (RFP). This RFP was cancelled on February 19, 1976. (NASA News, Release No. 8-176, dated February 27, 1976.)

March 1976

**March 1:** For the second consecutive month of 1976, NASA tour patronage exceeded the patronage for the same period of 1975. During February 1976, more than 112,000 visitors took guided bus tours of Kennedy Space Center and Cape Canaveral Air Force Station. Tour patronage in February 1975 was 102,217, some 10,000 less than February 1976. (NASA News, Release No. KSC 83-76, dated March 1, 1976.)

- o NASA/KSC awarded \$18,000 to the University of Arizona's Institute of Atmospheric Physics Department to: (a) record E and H fields from lightning; (b) evaluate lightning characteristics from data of KSC net; (c) determine return-stroke propagation speeds photoelectrically; (d) record radio noise in HF and VHF bands; and (e) locate lightning with gated magnetic-field sensors during the Thunderstorm II Program. A contract was awarded by NASA/KSC to the University of Florida's Department of Engineering, in the amount of \$10,000, to investigate return-stroke field changes and lightning location by various methods during the Thunderstorm II Program.
- o NASA/KSC awarded \$35,000 to the Naval Research Laboratory to conduct aircraft measurements of the electric field and clouds. Personnel from the Naval Research Laboratory conducted simulated lightning ground test utilizing the Learjet and electrostatic source provided by Wright-Patterson AFB, Ohio, Equipment. (NASA/KSC, TS-OSM Report to management, dated September 1, 1976.)

**March 4:** NASA awarded a 7-month \$784,000 contract extension to the Aerospace Services Division, Pan American World Airways. Under the terms of the contract, Pan Am provides occupational medicine and environmental health services for civil service, contractor, and military service personnel at the John F. Kennedy Space Center. The extension covers the period from March 1, 1976, to September 30, 1976, and brings the total amount of the contract since 1971 to \$6,802,255. (NASA News, Release No. KSC 82-76, dated March 4, 1976.)

**March 9:** The Bicentennial Exposition on Science and Technology, "Third Century America," was given its own logo. The logo will appear on all exposition facilities and publicity material. The domes, which will be used to house government and industry exhibits, play an important part in the logo design. The remaining portion of the logo depicts the outline of a person with outstretched arms reaching for and looking into the future. (NASA News, 3rd Century America, KSC Release No. 96-76, dated March 9, 1976.)

**March 26:** RCA Satcom-2, the second in a series of three large 24 transponder commercial communications satellites, was successfully launched into a transfer orbit by Delta 121 from launch Complex 17A of the Eastern Test Range. The transfer orbit attained was measured at 35,-753 km apogee and 185 km perigee. The planned or expected apogee was 35,998 km with a perigee of 185 km. On March 29, the apogee kick motor (AKM) was fired to begin to maneuver the spacecraft to its operational position approximately 135 degrees West Longitude above the equator. This maneuver will require 7 to 11 days. After an evaluation period of 30 to 60 days, RCA Global Communications, Inc., will initiate operations. (Mission Operations Reports No. M-492-206-76-02, dated March 18, 1976 and April 13, 1976.)

**March 30:** NASA awarded a 2-month extension of a contract for reproduction services to McGregor & Werner, Inc. The \$246,696 extension covers the period from April 1, 1976, to May 31, 1976, and brings the total amount of the contract to \$3,474,247 since the initial award on April 1, 1974. (NASA News, Release No. KSC 111-76, dated March 30, 1976.)

**During March:** Meetings were held both at NASA HQS and the White House to solicit exhibitors from government and industry to occupy the 15 geodesic domes under construction at the Bicentennial Exhibition site. As of March 29, 15 government agencies in addition to NASA were committed. Of the 25 industrial firms invited to the White House on March 23, 18 sent representatives. Two companies (IBM and E Systems) agreed to participate, seven (AT&T, RCA, COMSAT, Bendix, LTV, Boeing, and Hughes) advised that they would not participate, and the remaining companies were undecided. (Bicentennial Exhibition Status Reports to NASA HQS from DY/Deputy Director, dated March 5, 16, 22, and 30, 1976.)

- o The House Committee on Science and Technology approved NASA's \$3.696 billion FY 77 budget request after making 15 minor changes to line items. Among the changes was a decrease of \$3.6 million for R&PM following NASA's 500-position reduction in personnel. The decrease was to affect categories other than personnel and related costs. The Committee also recommended an increase of \$3 million for the initiation of the development of a space telescope. All together, 15 minor changes resulted in a net reduction of \$930,000 from the (OMB) approved request. (Aviation Week and Space Technology, Volume 104, No. 10 page 15, March 8, 1976.)
- o In his message to NASA employees concerning NASA's FY 77 Budget Request, Dr. James C. Fletcher said, "The FY 77 budget for NASA, although remaining lean, is a healthy one." The budget plan as submitted to the congress called for a total budget of \$3,697 million.

Of this amount, \$2,758,925,000 was requested for Research and Development, \$124,020,000 for construction of facilities, and \$814,055,000 for Research and Program Management. Over \$41 million was budgeted for construction of KSC facilities and \$103,624,000 for KSC's portion of the Research and Program Management request. (NASA Activities, Volume 7, No. 3, National Aeronautics and Space Administration, March 1976.)

April 1976

April 1: NASA announced that a schedule of future launches projects an average of 18 launches per year through 1980. The schedule calls for a total of 83 launches to occur between April 1, 1976 and December 31, 1980. Of these, 43 spacecraft are to be launched by Delta, 21 by Atlas-Centaur, 6 by Atlas-F rockets, and 2 by Titan III-Centaur. A total of 61 launches will occur from Cape Canaveral. More than three-fourths of the launches will be on a reimbursable basis, i.e., NASA will be reimbursed for the launch vehicle and launch support charges. These launches are made for private industry, other Federal agencies, and other government and international agencies. The remaining launches involve Scout vehicles to be launched from Wallops Island Station or from Scout facilities at the WTR. (NASA Fact Sheet, Release No. KSC 99-76, dated April 1, 1976.)

April 2: Plans to paint the largest American flag ever painted and a 110-foot American Revolution Bicentennial symbol on the South wall of the Vehicle Assembly Building were jointly announced by John Warner, Director, American Revolution Bicentennial Administration (ARBA) and Lee R. Scherer, KSC's Center Director. The 209-foot by 110-foot flag and the 110-foot ARBA symbol will require more than 500 gallons of paint. The paint, specially formulated by Montgomery Ward, was donated by that company. Funds for painting the flag and symbol were received from ARBA in March, and a contract was awarded to Apollo Painting, Inc., of Merritt Island, Florida. (News, 3rd Century America, News Release No. KSC 112-76, dated April 2, 1976.)

- o NASA awarded a \$516,971 1-year contract extension to Atlantic Technical Services Corporation of Casselberry, Florida, for continued operation of the mail and distribution support services. The extension covers the period from April 1, 1976, through March 31, 1977. The contract, a small business set-aside, was initially awarded on January 1, 1975. Total amount of the contract, including the new extension, is \$1,107,950. (NASA News, Release No. KSC 113-76, dated April 2, 1976.)
- o More than 118,000 visitors toured KSC and the Cape Canaveral Air Force Station in March, bringing the total tour patronage for 1976 to 312,862. This figure was 10,000 less than the same 3 months in 1975. However, the record figures for the 3 months in 1975 are attributed primarily to a March Easter vacation period. (NASA News, Release No. KSC 114-76, dated April 2, 1976.)

- o Eighty-two Kennedy Space Center employees and four groups were presented awards at the Center's Awards Ceremony. Center Director Lee R. Scherer and Deputy Center Director Miles Ross announced the names of the recipients. James S. Martin, Viking Project Manager, Langley Research Center, specifically recognized awardees who participated in the two Viking launches to Mars in 1975.

Recipients of the Center's highest award, the KSC Certificate of Commendation, were William A. Berndt, Mary Sue Carpenter, John D. Gossett, Chester R. Norris, John R. Zeman, Harold Zweigbaum, William F. Huseonica, Joseph C. Hand, Jack F. Baltar, John B. Parks, Creighton A. Terhune, and James L. Womack. A Group Certificate of Appreciation was awarded to the Bendix Launch Support Division, and an individual certificate of appreciation was awarded to Sellard D. Hellman, Technicolor Graphic Services. Also, Group Achievement Awards were made to Federal Electric's Main Telemetry Branch, the Expendable Launch Vehicle Directorate's Viking Launch Operations team, and to the Information Systems Directorate's Operations and Data Management team. Rounding out the 82 awards were Sustained Superior Performance Awards (1), Quality Step Increase Awards (5), Cost Reduction Awards (4), Cost Reduction Certificates (12), an Equal Opportunity Award, Federal Woman of the Year Award, and service recognition for 40-, 35-, and 30-year employees. (NASA News, Release No. KSC 116-76, dated April 2, 1976).

**April 6:** NASA awarded a \$235,000 contract extension to New World Services, Inc., for the continuation of library support services. The fixed-price extension covers the period from April 1, 1976, through March 31, 1977. New World Services, the first minority firm at KSC to progress to regular small business status, was awarded the basic contract on April 1, 1974. The contract's total value since that date is \$620,453. (NASA News, Release No. KSC 117-76, dated April 6, 1976.)

**April 12:** NASA awarded an \$860,800 contract to Fulford Construction, Inc., and Associated National Construction, Inc., a joint venture, of Indian Harbor Beach, Florida. Contract NAS 10-8966 covering the period from April 1, 1976, to February 1, 1977, calls for modifications to the hypergol maintenance facility. This facility consists of five buildings in the Center's Fluid Test Complex in KSC's Industrial Area. (NASA News, Release No. KSC 118-76, dated April 12, 1976.)

**April 17:** Helios 2 successfully made its first perihelion passage as programmed and became man's closest approach to the sun. All 10 experiments aboard the spacecraft were performing perfectly, and all space-craft systems were functioning as expected. (Field Report, Titan/Centaur-5 Helios 2, prepared by Centaur Operations Division, KSC-EV, TR-1447, dated June 30, 1976.)

**April 21:** NASA awarded the first contract for modifying KSC facilities to process the European-built Spacelab to Pan American Technical Services, Inc., of Cocoa Beach, Florida. The \$129,627 contract, Contract NAS 10-8971, covers architect and engineering services for the design of modifications to KSC's Operations and Checkout building. The modifications include changes in utilities (gaseous nitrogen, helium, high pressure air, water, air-conditioning) and adaptation of the Apollo Acceptance Checkout Equipment rooms for compatibility with the European Space Agency furnished ground support equipment for automated Spacelab testing. (NASA News, Release No. KSC 128-76, dated April 21, 1976.)

**April 22:** NATO-111A, the first of a series of NATO defense related military communications satellites, was successfully launched into a synchronous transfer orbit by Delta 122 from LC 17A at the Eastern Test Range. Its measured apogee was 34,884 km and its perigee was 186 km as against its expected apogee and perigee of 35,480 km and 185 km respectively. On April 24, the spacecraft was maneuvered to a position approximately 15 degrees West Longitude (Atlantic) over the equator. The spacecraft is capable of transmitting voice, data, facsimile, and telex messages among military ground stations. (Mission Operations Report M-492-207-76-01, dated April 19, 1976 and Mission Operations Report, same number, dated May 20, 1976.)

**April 28:** A 3-month \$219,000 contract, Contract NAS 10-8969, was awarded to the Stevens Company of Lancaster, California. The contract is for modifying and remodeling a hangar and hangar annex at North Base, Edwards Air Force Base, to serve as a support unit for the Space Shuttle Orbiter's Approach and Landing Test (ALT) scheduled to begin in 1977. (NASA News, Release No. KSC 139-76, dated April 28, 1976.)

- o NASA awarded a \$42,917 contract, Contract NAS 10-8787, to Pan American Technical Services, Inc., for architectural and engineering services during modifications of the Fluid Test Complex for the Space Shuttle. The contract is a follow-on agreement to monitor modifications to the Complex designed by Pan American Technical Services under a contract covering the period from January 15, 1975, to December 8, 1975. Total value of the contract and follow-on agreement is \$374,306. (NASA News, Release No. 140-76, dated April 28, 1976.)

**During April:** House and Senate Committees will name conferees to iron out differences of opinions relating to NASA's budget request for FY 77. The Senate recommended an additional \$780,000 over the House approved authorization. Areas of differences on projects and funding are: Space telescope, Lunar and Planetary program, Landsat C spacecraft project, Variable cycle engines, Research and Technology Base, and Tracking and Data Acquisition Program. (Aviation Week and Space Technology, Volume 104, No. 17, page 19, dated April 26, 1976.)

May 1976

May 1: NASA awarded a \$610,004, contract for Standards and Calibration Support Services to Bionetics Corporation of Hampton, Virginia. Negotiations for the 1-year with renewal options were begun on March 23, 1976. The contract, a small business set-aside, is for services previously provided under the Center's contract with Federal Electric Corporation. (NASA News, KSC Release No. 109-76, dated March 23, 1976; and NASA contract NAS 10-8965, dated May 1, 1976.)

May 4: NASA awarded a \$150,000 contract to Sverdrup & Parcel and Associates, Inc., of Jacksonville, Florida. The 6 months Architect/Engineering contract covers the design of modifications to the Vehicle Assembly Building (Low Bay) for Space Shuttle solid rocket booster refurbishment, paint, and insulation facilities. (NASA News, Release No. KSC 164-76, dated May 4, 1976.)

LAGEOS-1 (Laser Geodynamic Satellite) was successfully launched into orbit by Delta 123 from Launch pad SCL-2W, Western Test Range. The LAGEOS is a completely passive 60 cm aluminum sphere containing 436 retroreflectors mounted almost symmetrically over its entire surface. The objectives of the LAGEOS-1 mission are to demonstrate the feasibility and utility of a ground-to-satellite laser ranging system in contributing to our knowledge of solid-earth dynamics.

May 12: NASA expanded its concession agreement with TWAS to include the operation of the Bicentennial Exposition. TWAS will sell tickets, food, and souvenirs and provide security, custodial, hospitality, and parking services to accommodate those attending the exposition. TWA appointed a full-time operations supervisor, and he and his staff have moved into on-site office facilities. (NASA News, KSC Release No. 169-76, dated May 12, 1976; Bicentennial Exposition Status Report to NASA HQS from DY/Deputy Director, dated May 5, 1976.)

May 13: A 3D mathematical model developed by the University of Miami under contract with KSC has already been tested at a Florida Power and Light Co. plant on Biscayne Bay near Miami. This model will be given its first fresh water test at Lake Belews, North Carolina.

NASA/KSC has awarded a \$55,000 contract (fund provided by the Duke Power Co.) to the U of M to use the model to study the extent of thermal discharges from the Belews Steam Station, a fossil fuel power

plant east of Winston-Salem, North Carolina. Roy Bland, project study manager in KSC's Applications Projects Branch, said four NASA-6 over-flights will be conducted during the year-long project; the first flight is scheduled for May 18. (NASA Spaceport News, Vol. 15. No. 10, dated May 13, 1976.)

- Comstar D-1, the first in a series of Comsat domestic communications satellites, was successfully launched by an Atlas-Centaur (AC-38) from Pad A, Launch Complex 36. The Comstar was built by Hughes Aircraft Company for Comsat General Corporation, a subsidiary of Communications Satellite Corporation. The satellite is leased to the American Telephone and Telegraph Corporation as a part of a nationwide communications network and has a capacity to provide more than 14,000 two-way, high quality voice circuits. Three comstars are planned for the system. Once it is operational, the system will provide communications to the 48 continental states as well as to Alaska, Hawaii, and Puerto Rico. NASA, as the launch agency for Communications Satellite Corporation, was reimbursed approximately \$22 million for launch support operations. (Mission Operations Report No. M-491-201-76-01, dated May 10, 1976.)

May 17: In orbit, performance of the CTS's traveling wave tube and its power supply has been successfully demonstrated. The system was turned on February 8, 1976, and has been operated 1000 hours. The 200-watt communications system met all specifications. Between February 17, 1976, and May 17, 1976, spacecraft compatibility with small, low-cost ground terminals was demonstrated. (Mission Operations Report, No. E-610-76-01, dated August 3, 1976.)

May 18: NASA has awarded a \$295,000 contract modification to Sverdrup Parcell and Associates of Jacksonville, Florida. The contract modification is for architectural and engineering services for design modification to Hangar AF and the area north of the Saturn I dock area at the Cape Canaveral Air Force Station. The facilities will be used for off-loading and disassembling spent Space Shuttle Solid Rocket Boosters. The 233-day contract brings the total contract value to \$445,000. (NASA News, Release No. KSC 175-76, dated May 18, 1976.)

- A fixed-price contract covering materials and labor for modifying the Ordnance Storage Facility in the KSC Industrial Area was awarded by NASA to Frank A. Kennedy, Inc., of Cocoa Beach, Florida. The 108-day, \$65,989-contract calls for partitioning the main storage room; modifying existing air conditioning, ventilation, interior and exterior lighting; construction of a security fence; and the installation of new exhaust fans and filters. The Space Shuttle's radioisotope thermal generation motors will be stored in this facility. (NASA News, Release No. KSC 174-76, dated May 18, 1976.)

May 21: KSC's Center Director Lee R. Scherer made the first official landing on the Orbiter Landing Facility. Mr. Scherer, at the controls of NASA-6, a twin-engine Beechcraft, made two touch-and-go approaches before setting the craft down and taxiing it to the apron at the southeastern end of the landing facility. Moments later, KSC's Deputy Center Director, flying a Cessna Cardinal aircraft, made the second official landing. (Spaceport News, Volume 15, No. 11, John F. Kennedy Space Center, NASA, May 27, 1976.)

May 24: NASA awarded a \$74,313 contract extension to Pan American Technical Services, Inc., for architectural and engineering services for additional designs to the Hypercolic Maintenance Facility at KSC's Fluid Test Complex area. This facility will be used to process the Space Shuttle's hypergolic modules. Under the contract extension, Pan American will design propellant and gas piping, cables, power supply circuits, platform flip-ups, cable trays, and miscellaneous support equipment used in the facility. The total value of the contract is now \$150,254. (NASA News, Release No. KSC 179-76, dated May 24, 1976.)

May 27: Sunday drive-through tours of KSC were suspended for the summer effective May 30. The public will be permitted direct access to the Bicentennial Exposition site in the Launch Complex 39 area, but all other areas are to be placed off-limits for the duration of the Exhibition. (NASA News, Release No. 188-76, dated May 27, 1976.)

May 20-30: The gates to the Bicentennial Exhibition opened on May 29 and May 30 in a 2-day preview shakedown operation. May 29 was designated "Employee Day" and all KSC, Air Force, and contractor personnel and their families were invited to see the exposition without charge. On May 30, the exposition was opened to the public without charge. Approximately 30,000 people attended each day. The 2-day preview revealed many problems which were either immediately solved or would be solved before the start of the summer tourist season. (Spaceport News, Volume 15, No. 11, John F. Kennedy Space Center, May 27, 1976. Also Bicentennial Exposition Status Report to NASA HQS, from DY/Deputy Director, June 2, 1976.)

May 31: Attendance at the Bicentennial Exposition on the second official day of operation and the first day that admissions were charged was 2,980 persons. The number of people was greater than expected for this traditionally low tourist period. (Bicentennial Exposition Status Report to NASA HQS from DY/Deputy Director, June 2, 1976.)

During May: Uncertainties developed about the availability of Orbiters 4 and 5 in 1983 and 1984. Neither NASA nor the Department of Defense wishes to absorb the \$1 billion cost of the two vehicles. Malcolm R. Currie, Director of Defense Research and Engineering, stated that if the DOD funded the \$1 billion, the costs would invalidate the cost savings to the DOD as a Space Shuttle user. NASA is studying various funding arrangements and their effects on the agency if it becomes necessary for NASA to assume the funding responsibilities. Final decisions on the matter may be made during a meeting of Dr. James C. Fletcher, NASA Administrator; Donald H. Rumsfeld, Secretary of Defense; and James Lynn, Director, Office of Management and Budget. (Aviation Week and Space Technology, Vol. 104, No. 20, May 17, 1976, page 22; Aviation Week and Space Technology, "Washington Roundup" Vol. 104, No. 21, May 24, 1976.)

June 1976

**June 1:** Following completion of negotiations initiated on May 6, NASA awarded a \$1,105,930 contract to Management Services, Inc., of Huntsville, AL. The small business contract is for component refurbishment and chemical analysis support services. These services were previously provided under the Center's support contract with Bendix Corporation. The contract is for 1 year with optional renewals over the next 2 years. (NASA News, KSC Release No. 167-76, dated May 6, 1976; and NASA Contract, NAS 10-8983, dated January 6, 1976.)

**June 3:** NASA awarded a contract for \$3,926,600 to Frank Briscoe Company, Inc., of East Orange, New Jersey, for construction of the second phase of the Space Shuttle Orbiter Processing Facility (OPF). A contract for \$8,733,300 for construction of the first phase was awarded in July 1975. The OPF is being built west of the Vehicle Assembly Building. It is in this facility that returning Orbiters will be safed, serviced and maintained, and prepared for the next mission. The new contract covers the period from May 26, 1976, through August 25, 1977. (NASA News, Release No. KSC 202-76, dated June 3, 1976.)

o NASA awarded a \$14,944,594 contract extension to The Boeing Company's Field Operations and Support Division for continuing support of NASA's operations at KSC and the Cape Canaveral Air Force Station. Under the contract, Boeing provides support in the areas of test support management, plant engineering and maintenance, supply and transportation operations, documentation, fire prevention and protection, rescue services, quality assurance, security, and training. The cost-plus fixed-fee extension covers the period from June 1, 1976, through January 31, 1977. The extension brings the total value of the Boeing contract, originally signed on March 1, 1971, to \$145,568,963. (NASA News, Release No. KSC 202-76, dated June 3, 1976.)

**June 4:** The Congress enacted Public Law 94-307 authorizing an appropriation of \$3,283,745,000 to NASA for the fiscal year 1977. This represented a reduction of \$413,255,000 in NASA's budget request. Of this amount, \$408,925,000 was cut from the Research and Development request; \$3,730,000 was cut from the Construction of Facilities request; and \$600,000 was cut from the Research and Program Management budget request. (Public Law 94-307, 94th Congress, H. R. 12453, dated June 4, 1976.)

**June 9:** Marisat 2, the second in a series of three maritime communications satellites, was successfully launched onboard Delta 124 from Pad 17A at the Eastern Test Range. The spacecraft was placed in a synchronous transfer orbit with an apogee of 36,924 km and a perigee of 185 km. The expected apogee and perigee were 36,788 km and 185 km respectively. (Mission Operations Report, No. M-492-205-76-02, dated October 14, 1976.)

**June 10:** NASA awarded a contract for \$339,640 to Precision Fabrication and Cleaning, Inc., of Sharpes, Florida. The contractor will test and refurbish KSC's 64 compressed-gas trailers. The trailers are used for mobile distribution of high pressure helium, nitrogen, oxygen, hydrogen, and air in support of the Space Shuttle, expendable vehicles, and institutional projects at KSC. (NASA News, Release No. KSC 222-76, dated June 10, 1976.)

**June 11:** At Marisat 2's seventh apogee, the Apogee Boost Motor (ABM) was fired to maneuver the spacecraft over the Pacific ocean to a position approximately 176 degrees East Longitude and above the equator. Marisat 2 will provide the same service to Pacific shipping as that provided to Atlantic shipping by Marisat 1. All subsystem checks have been completed, and the spacecraft is functioning satisfactorily. (Mission Operations Report, No. M-492-205-76-02, dated October 14, 1976.)

**June 14:** Speaking from the White House, President Gerald R. Ford addressed attendees at a ceremony dedicating 3rd Century America, the Bicentennial Exposition on Science and Technology. Attending the ceremony were Dr. James C. Fletcher, NASA Administrator; KSC Director Lee R. Scherer; executives of other Federal Agencies; and industrial firms sponsoring exhibits at the exposition. (NASA News, Release No. KSC 225-76, dated June 10, 1976.)

**June 19:** The first of two Viking spacecraft went into orbit around Mars, ending a 400-million-mile journey. Viking I was launched aboard a Titan III Centaur space vehicle from LC-41, Cape Canaveral Air Force Station, on August 20, 1975. The retrorocket of the spacecraft was fired at 6:38 p.m. E.D.T. The 37-minute, 49-second burn placed the spacecraft in a highly elliptical preliminary orbit with an apogee of 31,286 miles and a perigee of 940 miles. Viking I will be placed in a synchronized orbit with the planet's rotation in preparation for a landing on June 4, 1976. (Spaceport News, Vol. 15, No. 13, John F. Kennedy Space Center, NASA, June 25, 1976, page 2.)

**June 21:** The annual increase in Florida tourism which follows the closing of schools in northern states brought a corresponding increase in attendance at the Bicentennial Exposition. Attendance, which had averaged 3000 persons per day during the first 13 days of June, increased to 4000 on June 13, and remained at that average for the week. (NASA News, Release No. KSC 251-76, dated June 21, 1976.)

**June 22:** NASA awarded a \$19,464,511 contract extension for engineering support services to Planning Research Corporation of McLean, VA. The contract calls for continued design engineering support services for the Space Shuttle program. These services are performed at Kennedy Space Center and Cape Canaveral Air Force Station, Dryden Flight Research Center, Edwards Air Force Base, and at KSC's Western Launch Operations Division at Vandenberg Air Force Base, CA. The contract extension brings the total amount of the contract originally awarded in May, 1974, to \$44,533,777. (NASA News, Release No. KSC 267-76, dated June 22, 1976.)

**June 25:** A \$402,146 contract was awarded by NASA to Applicon, Inc., of Burlington, Mass., to furnish equipment for modification and reconfiguration of KSC's automated drafting system. This system is used for production of engineering drawings of Space Shuttle facilities and ground support equipment. The 1-year contract will become effective on April 1, 1976. (NASA News, Release No. KSC 280-76, dated June 25, 1976; and NASA Contract NAS 10-8973, dated April 1, 1976.)

- o KSC press release #279-76 announced TRIP 76's existence and summarized its purpose.

**June 25:** A five-and-one-half month contract extension was awarded by NASA to New World Services of Titusville, Florida, for automatic data processing key punch services. The \$211,382 contract will run from June 16 to November 30, 1976, and brings the total contract value to \$2,245,544. (NASA News, Release No. KSC 281-76, dated June 25, 1976.)

**June 29:** A press conference was held at Bicentennial Exposition with TRIP investigators in attendance to explain their programs and answer questions about their work. (Ref: Various news articles on 6/30/76 - "Today" specifically.)

During June: The first major delivery of Shuttle ground support equipment arrived at KSC - the Microwave Scanning Beam Landing System Ground Station (MSBLS). The system, in conjunction with on-board Shuttle equipment, will provide data during the final approach and landing phase to precisely guide the Orbiter to a safe landing on the runway. The system was manufactured by the Airborne Instruments Laboratories Division of Cutler Hammer, Inc., of Deer Park, New York, under a Johnson Space Center contract. On March 8, 1976, KSC awarded a \$1.4 million contract to this same company for the installation, checkout, and maintenance of the system. The first system will be used for the Orbiter Approach and Landing Tests (ALT) at the Dryden Flight Research Center/Edwards Air Force Base. (Spaceport News, Volume 15 No. 13, John F. Kennedy Space Center, June 25, 1976, pages 5 & 8. Also NASA Contract NASA 10-8960, dated March 1, 1976.)

- o Compilations of facts and figures of NASA's 1976 Savings Bond campaign placed KSC as number one among all NASA installations. KSC's percentage of participation was 92.7 percent as compared to a 76.4 percent participation NASA-wide. Of the 2,289 personnel at KSC, 2,122 are participating in the Savings Bond program. (Spaceport News, Volume 15, No. 13, John F. Kennedy Space Center, dated June 25, 1976, page 7.)

July 1976

**July 1:** Roy Bland of the Sciences, Technology, and Applications Office presented a paper titled: Landsat Signature Development Program (LSDP), at Purdue University, West Lafayette, Indiana, July 1, 1976. LSDP is a computer program written at KSC by Royce Hall and Kenneth McGuire, both of Federal Electric Corporation, and is designed to produce an unsupervised classification of a scene from a Landsat tape. The program will generate a character map that, by identifying each of the general classes of surface features extracted from the scene data with a line printer symbol, indicates the approximate locations and distributions of these general classes within the scene. ("Machine Processing of Remotely Sensed Data," Symposium Proceedings, Purdue University, West Lafayette, Indiana, June 29, through July 1, 1976.)

**July 8:** Palapa-1, the first of a series of Indonesian communications satellites, was successfully launched onboard Delta 125 from Pad 17A at the Eastern Test Range. Palapa, built by Hughes Aircraft Company, was designed to provide television, voice, and data throughout Indonesia. The satellite has facilities for relaying 12 color television channels or up to 4,000 telephone circuits. Its life expectancy is 7 years. (Mission Operations Report M-492-208-26-01, dated June 24, 1976.)

**July 12:** NASA awarded a \$116,000 fixed-price contract to Sanders and Thomas, Inc., Miami, Florida, to design modifications to the parachute facility in the KSC Industrial area. This facility will be utilized in the Shuttle program for washing, drying, refurbishing, and repacking parachutes used in the solid rocket motor recovery operations. (NASA News, Release No. KSC 329-76, dated July 12, 1976; Contract No. NAS 10-9003, dated June 17, 1976.)

**July 13:** Four KSC employees recommended by the Manpower Review Board were selected by the Office of Professional Development, NASA Headquarters, to participate in the 1976-77 Career Development Program. The four, Ms. Mae Walterhouse, and Messers. Raymond Kimlinger, James Stephens, and Robert Kimble, will begin the development program on September 7, 1976, in Washington, D.C. (Letter from Mary Fortune, Director, Office Professional Development to Kennedy Space Center, Attn: Lee R. Scherer, Director, dated July 13, 1976. Also, Spaceport News, Vol. 15, No. 16, John F. Kennedy Space Center, dated August 6, 1976, and Spaceport News, Volume 15, No. 17, John F. Kennedy Space Center, dated August 20, 1976.)

**July 14:** NASA awarded a \$2,250,000 contract for the development of the Space Shuttle Orbiter fuel cell system to the Beech Aircraft Corporation, Boulder, Colorado. The contract calls for Beech Aircraft to design, fabricate, test, and deliver the complete cryogenic, remotely controlled unit which will provide liquid hydrogen and liquid oxygen for Orbiter fuel cells. Delivery of the system to KSC is scheduled for December 1977. (NASA News, Release No. KSC 333-76, dated July 14, 1976; Contract No. NAS 10-9017, dated June 29, 1976.)

**July 19:** The first phase of a test program to determine the effects of salty and brackish water on materials to be used in the solid rocket boosters of the Space Shuttle Orbiter was completed by KSC and MSFC. The tests were conducted using a structure 2.7 meters long and 3 meters in diameter constructed from the same materials and protected by the same sealants and paints planned for the solid rocket boosters. Attached to the structure were samples of electronic boxes, electrical connectors, and other components under consideration for solid rocket booster use. The first phase of the test consisted of submerging the structure 80 percent of its length in the Atlantic Ocean for 7 days and in the Banana River for an additional 3 days. The structure was retrieved and sent to MSFC for corrosion analysis. The second phase of the testing calls for a refurbished structure to undergo a similar test. (NASA News, Release No. KSC 341-76, dated July 19, 1976.)

**July 20:** The Viking I Lander landed on Mars at the western margin of the Chryse Planitia region at 7:53 a.m. E.D.T., 11 months after its launch from Complex 41. The Viking had gone into Martian orbit on June 29 with the original landing date of July 4. Unexpectedly rough terrain at the primary landing site forced a delay of the landing until a new site could be selected. Between July 2 and July 11, spacecraft photographs backed by scans of the Arecibo, Puerto Rico, radio telescope resulted in the selection of the Chryse Planitia Site. Touchdown of the Lander was accomplished without problem. (Spacecraft News Vol. 15, No. 14, dated July 9, 1976, and Spaceport News Vol. 15, No. 15, dated July 23, 1976. Also Aviation Week & Space Technology, Vol. 105, No. 1, dated July 5, 1976, pp 23-27.)

- o NASA awarded a contract for \$3,452,000 to the Mayfair Construction Company of Chicago, Ill., for the installation of an Orbiter processing system, and an electrical cable system in the Orbiter Processing Facility. Work is to begin July 19, 1976, and is scheduled for completion by August 1, 1977. (NASA News, Release No. KSC 347-76, dated July 20, 1976, and Contract No. NAS 10-9025, dated July 13, 1976.)

**July 22:** Following an on-site inspection by William E. Eckenrod, FAA Airport Certification Division, Atlanta, Georgia, the 15,000-foot-long Orbiter Landing Facility was granted a Limited Airport Operations Certificate. The certificate permits certified air carriers to make non-scheduled flights to and from the Orbiter Landing Facility. (NASA News, Release No. KSC 350-76, dated July 22, 1976.)

- o Comstar D-2, the second in a series of three Comstar satellites, was successfully launched by an Atlas-Centaur (AC-40) from Pad B, Complex 36. Like its predecessor, Comstar D-1, the spacecraft will be leased by the American Telephone and Telegraph Company as part of a domestic communications system. NASA provided the launch support for this mission on a fully reimbursable basis. For this, Comsat General Corporation, a subsidiary of the Communications Satellite Corporation, paid NASA in excess of \$22 million. (Mission Operation Report No. M-491-201-76-D2, dated July 20, 1976.)

**July 23:** Dr. James Ragusa of the Sciences, Technology, and Applications Office, recently completed a study entitled "An Optimum Organizational Structure for a Large Earth Orbiting Multidisciplinary Space Base." Dr. Ragusa carefully considered a number of different types of organizational structures with a view toward choosing the best possible structure for a space base. The proposed space base will be designed for a 10-year operating life. The Space Shuttle will be used to transport materials needed to assemble the station and to supply it with equipment, personnel, and food. Personnel staffing the facility numbering from 50 to 100 engineers and technologists of varying backgrounds and nationalities - will spend extended periods of time at the base. (NASA Spaceport News, Vol. 5, No. 16, dated July 23, 1976.)

**July 29:** NOAA-5 (ITOS-H), the fifth spacecraft of a series of second-generation operational meteorological satellites, was successfully launched into orbit by Delta 126 from Pad SLC-2W at the Western Test Range. The Improved Tiros Operational Satellite (ITOS) will provide global cloud cover data, both day and night. Onboard the NOAA-5 were an improved atmospheric sounder and the very high resolution radiometer. (Mission Operations Report No. E-601-76- 17, dated July 30, 1976.)

**During July:** NASA issued a call for Space Shuttle astronaut candidates. Applications will be accepted until June 30, 1977, and selections are to be announced by the following December. At least 15 pilots and 15 mission specialists will be selected to report to the Lyndon B. Johnson Space Center (JSC) for 2 years training beginning July 1, 1978. NASA anticipates having women and members of minority races among the qualified candidates selected for the program. Thirty-one persons are al-

ready available for the Shuttle program, including nine students. Twenty-eight are astronauts assigned to JSC, and three had Government positions in Washington, D.C.

- o The Senate Appropriations Committee directed NASA to submit a report by October 1, 1976, on the effects of a possible 2-year obligational limitation on research and development funds. Senator William Proxmire attempted to include a 2-year obligational limitation in NASA's FY 77 appropriation bill, but the attempt was rejected by the other committee members. Senator Frank Moss opposed the 2-year obligational limitation, but agreed to having NASA report on the proposal. Under the present system, funds appropriated for research and development are available for obligation until expended. The proposed change would require NASA to return all unobligated funds at the end of the 2-year period. The issue will be discussed once more during FY 78 appropriation hearings. (Aviation Week & Space Technology, Vol. 105, No. 2, dated July 12, 1976, p. 43.)

August 1976

**August 3:** During July, more than 150,000 people took the guided bus tours of the Kennedy Space Center and Cape Canaveral Air Force Station. In addition, more than 160,000 people purchased tickets to 3rd Century America, bringing the total number of visitors to 314,292. Through the first 7 months of 1976, 749,651 persons have patronized the two attractions. (NASA News, Release No. KSC 388-76, dated August 3, 1976.)

**August 4:** A Hanover, Indiana, resident, Mr. David Perry, became the 10 millionth visitor to tour the Kennedy Space Center and Cape Canaveral Air Force Station. Immediately after purchasing his tickets, Mr. Perry and his family were greeted by officers of NASA and TWA Services, Inc. Robert Newman, NASA's Assistant Administrator for Public Affairs, and Chuck Hollinshead, KSC Chief, Public Affairs, escorted the Perry family to the KSC Headquarters Building where they met Center Director, Lee R. Scherer. Later, the family was given tickets to 3rd Century America and a VIP tour of KSC and CCAFS, and were guests of honor at a dinner hosted by Harry B. Chambers of TWA Services, Inc. (NASA News, Release No. KSC 391-76, dated August 4, 1976.)

**August 6:** Senator Barry Goldwater, ranking minority member of the Senate Space Committee, praised the value of the space program and criticized the "uninformed people" who claim that money spent in the space program should be used in other ways. Goldwater firmly believes that space spinoffs will yield dividends in excess of the total costs of the space program in the next 10 years. (Defense/Space Business Daily, Vol. 87, No. 25, dated August 6, 1976, p. 195.)

**August 7:** A 39-minute, 35-second burn of its retrorocket inserted Viking 2 into a 932- by 22,126-mile orbit around Mars. Initial photographs of the primary landing site on the Acidalia Plains indicated the area was too rough for a safe landing. Alternate landing sites to the east and west of the primary site will be surveyed. The Viking 2 is scheduled for touchdown on September 2, 3, or 6, depending upon the landing site chosen. (Aviation Week & Space Technology, Vol. 105, No. 7, dated August 16, 1976, p. 14. Also, Defense/Space Business Daily, Vol. 87, No. 27, dated August 10, 1976, p. 216.)

**August 15:** Full service with the two Comsat General Marisat Communications Satellites began August 15 with the inauguration of commercial services via Marisat 2. Services to the Navy in the Pacific area began June 28, 1976. (Defense/Space Business Daily, Vol. 88, No. 2, dated September 2, 1976, p. 11.)

**August 25:** Phase II construction of the Orbiter Landing Facility (OLF) has been completed. This facility consists of a runway and associated facilities required for coordinating and controlling terminal navigation of the Orbiter during land or launch abort conditions. In addition to the 15,000-foot concrete runway, the OLF consists of a towway to the Orbiter Processing Facility, a Landing Aids Control Building, a Tactical Air Navigation Building, a Microwave Scanning Beam Landing System, Cloud Height Measuring Equipment, Visibility Measuring Equipment, and Operational Television Equipment. Phase II construction included design and construction of the Landing Aids Control Building, the landing instrumentation facilities, electrical power and water distribution, and the communications power plant. Phase I construction, completed on July 14, 1976, consisted of total site work and construction of the runway, air field lighting, and feeders for electrical power and water. (Schedules and Status Summary, Volume I, Space Shuttle, KSC, K-SM-03.1, John F. Kennedy Space Center, NASA, October 29, 1976, p. 11, and Shuttle Facilities, Baseline Descriptions, K-SM-01, Appendix A, John F. Kennedy Space Center, NASA, dated June 2, 1975, p. A-1.)

**August 27:** An awards ceremony was held in the mission room of the Operations and Checkout Building honoring 55 KSC and AFETR employees. KSC Director Lee R. Scherer presented letters of appreciation to four Cooperative Education Program students assigned to the Digital Electronics Systems Division of Design Engineering. A Group Achievement Award was presented to seven members of Detachment 11, 2nd Weather Squadron, Patrick Air Force Base. A second Group Achievement Award was presented to the 17 members of KSC's Viking Lander Team who had worked on the Viking Lander at both the Martin-Marietta plant in Denver and at KSC. Certificates of Commendation, the highest KSC honorary award, were presented to 19 KSC employees. In addition, one KSC employee, Archie F. Young, was awarded a 40-year service award; Leo J. Cote, Prosper A. Fagnant, and Robert M. Sibert received 35-year service awards; and 30-year service awards went to Harold E. Canady, Lynnwood G. Mason, Arthur G. Porcher, Anne R. Reamsnider, and Charles E. Welly. (Spaceport News, Vol. 15, No. 19, John F. Kennedy Space Center, dated September 17, 1976, p. 3.)

**August 30-31:** The Spacelab Program Director's Review was held at KSC on August 30-31. Doug Lord, Director of the Spacelab Program, conducted the meeting which was attended by Spacelab team members from NASA Headquarters, KSC, MSFC, and JSC. (Spaceport News, Vol. 15, No. 18, John F. Kennedy Space Center, September 3, 1976.)

**August 31:** NASA has narrowed the number of competitors for the assembly and checkout of the Orbiter solid rocket booster assemblies to three: Boeing Services International, Seattle; United Space Boosters, Inc., Sunnyvale, California; and SPATEC Corp., a subsidiary of Chrysler Corporation. McDonnell Douglas Astronautics Company, Huntington Beach, CA., was eliminated from the competition. The cost-plus-award-fee contract calls for the assembly, checkout, launch, and refurbishment of the solid motor assemblies, but does not include the solid motor which goes back to Thiokol for refurbishment. (Defense/Space Business Daily, Vol. 87, No. 28, dated August 31, 1976, p. 224.)

**During August:** A railway car transporting a structure simulating the size of the solid rocket booster aft and forward skirts stopped at KSC. The 19-foot-6-inch by 13-foot-1-inch structure simulates the size, but not the shape, of the SRB components. The unit, carried on a Southern Railway flat car, is being used to assure that bridge and overhead clearances are adequate for transporting SRB units from Thiokol Corporation's Brigham City, Utah, installation to Vandenberg AFB or KSC. (Spaceport News, Vol 15, No. 17, John F. Kennedy Space Center, dated August 20, 1976.)

- o An oversight study of NASA's management structure was initiated by the House Science and Technology ad hoc subcommittee for special studies, oversight, and investigation. The new subcommittee is chaired by Rep. Olin E. Teague. This subcommittee expects to issue an interim report of its findings by the end of the year. (Aviation Week & Space Technology, Vol. 105, No. 7, "Washington Roundup," dated August 16, 1976, p. 13.)
- o At the request of the OMB, NASA and the USAF are making a joint study to determine which organization should procure the last two Space Shuttle Orbiters. Recommendations drawn up by Malcolm Currie, Director, Department of Defense Research and Engineering and by George M. Low, former Deputy Administrator, NASA, will be considered by NASA in its discussions with DOD. (Aviation Week & Space Technology, Vol. 105, No. 9, "Industry Observer," dated August 30, 1976, p. 11.)

September 1976

**September 1:** A. Taiani made an operational report to KSC management on TRIP 76, summarizing the summer's activities. Twenty-one Principal Investigators from 18 different institutions (including 5 government agencies) mounted 42 study projects. Researchers and representatives came from England, Switzerland, and South Africa, as well as from the U.S. Seven aircraft were involved in the various projects. Three NASA Centers -- GSFC, JSC, and KSC -- had Principal Investigators. (Ref: Copy of report.)

**September 3:** The Viking 2 Lander successfully completed an automatic landing on the Utopia Planitia region of Mars after mission controllers lost the primary communications link through the Orbiter. The first indication that the Lander had touched down successfully came at 6:58 p.m. E.D.T. on September 3, as planned. Apparently, the Viking 2 Orbiter became disoriented during the Orbiter-Lander separation operation, and its communications antenna pointed away from the earth. It was not until some 8 hours later that the high-gain orbiter link was restored to operation and the first two pictures of the landing area were transmitted from the Orbiter's recorder. (Aviation Week & Space Technology, Vol. 105, No. 11, dated September 13, 1976, p.28 and Defense/Space Business Daily, Vol. 88, No. 5, dated Wednesday, September 8, 1976, p. 33.)

**September 7:** 3rd Century America, the U. S. Bicentennial Exposition on Science and Technology, closed its door for the last time. The event was marked by music, fireworks, and a cannon salute. The closing ceremony, attended by representatives of federal, industrial, and educational groups which had sponsored displays, began promptly at 6:15 p.m. The finish included the firing of some 350 to 400 skyrockets, a cannon salute by an Army drill team, and finally the lowering of the American flag as the U. S. Naval Training Center Band played the National Anthem, officially closing the exposition. Earlier in the day, a time capsule containing names of exposition patrons and memorabilia of the Nation's current life style was sealed. It will be re-opened on July 4, 2075. The time capsule will not be buried, but will be placed on permanent display at KSC's Visitors Information Center. (Spaceport News, Vol. 15, No. 19, John F. Kennedy Space Center, September 17, 1976, pp. 5-6.)

**September 8:** NASA was overridden by President Gerald R. Ford in the selection of the name for the first space shuttle. NASA had spent many months in research to select a name and finally decided upon "Constitution," for the U. S. Constitution and the U.S.S.

Constitution. However, fans of the TV program "Star Trek," mounting a letter campaign, influenced the President to name the Space Shuttle the "Enterprise." It was also suggested that since the Space Shuttle was to be used for international flights, the name Constitution might be too political. (Defense/ Space Business Daily, Vol. 88, No. 6, dated Thursday, September 9, 1976, p.47.)

**September 10:** NASA awarded a \$200,000 firm fixed-price contract to Reynolds, Smith & Hills of Jacksonville, Florida, for architect-engineering services for design modifications to the Saturn V/Apollo Mobile Launcher 2. All three Mobile Launchers will subsequently undergo modifications to adapt items to the Space Shuttle program. These modifications include removal of the jib crane and the launch tower, and additional openings will be made in the launcher platform to accommodate the exhaust gases of the Orbiter's main engine and two solid rocket motors. (NASA News, Release No. KSC 441-76, dated September 23, 1976; also NASA Contract No. NAS 10-9045, dated September 10, 1976.)

**September 17:** NASA awarded a \$1,199,610 firm fixed-price contract to the Chrysler Corporation Space Division for 21 pneumatic regulation and control panels used in connection with Space Shuttle operations. These panels are required to control the flow of nitrogen, helium, oxygen, and hydrogen to the Space Shuttle and ground support systems. The contract covers the period from September 17, 1976, through June 1, 1977. (NASA News, Release No. KSC 442-76, dated September 23, 1976; also NASA Contract No. NAS 10-9043, dated September 17, 1976.)

**September 17:** Orbiter Vehicle 101, named the "Enterprise" by President Ford, was rolled out of Rockwell International's Palmdale, California, facility during a ceremony attended by federal and state government representatives, foreign dignitaries, business leaders, NASA employees, news media, and invited guests. The Enterprise, first of five Space Shuttle Orbiters, is to be transported overland to NASA's Dryden Flight Research Center at Edwards Air Force Base. Starting in March 1977, Orbiter 101 will undergo a series of captive flight and drop tests. (NASA Activities, Vol.7, No. 10, dated October 1976; also, Aviation Week & Space Technology, Vol. 105, No. 12 dated September 20, 1976, pp. 13-14; and Aviation Week & Space Technology, Vol. 105, No. 13, dated September 27, 1976, p.14.)

- o Although Orbiter 101, the "Enterprise," rolled out of the Rockwell International facility on schedule, the Space Shuttle Main Engine (SSME), being built by Rockwell's Rocketdyne Division, is plagued with problems. The SSME's turbopump has exhibited shaft vibration problems which limit the speed of the pump. As a result of the vibration, turbine loads are excessive, leading to bearing

failures. Resolving the problem is expected to set the development approximately 4 months behind schedule, but it will not impact the first Shuttle Orbiter flight planned for mid-1979. Another problem is that Orbiter 101 exceeds its desired weight margins. NASA is currently looking for ways to eliminate several hundred pounds. (Defense/Space Business Daily, Vol. 88, No. 12, Friday, September 17, 1976, p. 93.)

**September 20:** NASA released a revised Space Transportation System Traffic Model which shows a total of 560 flights for the fiscal years 1980 through 1992. This number is 12 less than the previous model released in October 1974. The new model is under revision, however. The present model shows DOD flights through 1992 as 109, 47 less than previously. Of these, 38 are scheduled to be launched from the WTR as compared to 80 on the earlier model. The new model also shows 267 flights for NASA, 28 for other U. S. Government agencies, 60 for U. S. commercial missions, and 65 for foreign missions. Of these, 336 are scheduled to be launched from LC-39 and 84 from the WTR. Of the DOD missions, 71 are scheduled from LC-39 and 38 from the WTR. (Defense/Space Business Daily, Monday, September 20, 1976, pp. 98-99.)

**September 29:** NASA awarded a fixed-price contract for \$2,537,000 to the Frank Briscoe Co., Inc., of East Orange, N.J., for modifications to the VAB. The contract calls for construction of an External Tank Processing Support System in High Bay 4 and a Solid Rocket Booster Processing and Storage Facility in High Bays 2 and 4. Both aspects of the contract are to be completed in November of 1977. (NASA News, Release No. KSC 449-76, dated October 1, 1976; also, NASA Contract No. NAS 10-9040, dated September 29, 1976.)

- o W.R. Durrett briefed the Center Director and KSC Policy Staff on TRIP 76's accomplishments and presented the proposed budget for TRIP 77. Mr. Scherer approved the budget and continuation of the program through 1978. (Ref: Exec Comm 777 of September 30, 1976.)

**During September:** NASA is conducting studies to define experiments and operations for a possible early Space Shuttle mission to revisit the Skylab, with the aim of boosting it to a higher orbit. At the current rate of orbit decay, the Skylab will reenter the earth's atmosphere during the 1980-81 time period. By boosting it into a higher orbit, the life of the Skylab can be prolonged and provide time for further use of the facility. A revisit would also allow for astronauts to recover a capsule containing food and other items. These would be examined to determine the effects of long-time exposure to the space environment. (Defense/Space Business Daily, Vol. 88, No. 11, Thursday, September 16, 1976, p. 85.)

- o NASA plans to propose a new unit for the Space Transportation System in FY 77. The new unit, the Spinning Solid Upper Stage (SSUS), is to be a low-cost, unguided propulsion system for boosting small payloads from the Shuttle orbit into synchronous orbit. The SSUS will be developed in two weight classes: a "Delta class" unit for boosting payloads of 2,000 to 2,500 pounds and an "Atlas-Centaur class" for boosting payloads of 4,200 to 4,500 pounds. The SSUS will complement the Interim Upper Stage (IUS) currently under development which has the capability of boosting payloads of 5,000 pounds. (Defense/Space Business Daily, Vol. 88, No. 11, Thursday, September 16, 1976, p. 85.)
- o Andrew J. Pickett, Deputy Manager of KSC's Shuttle Projects Office, was appointed as leader of a special NASA study team by KSC's Director, Lee R. Scherer. The study team, made up of KSC and NASA Headquarters personnel, will study optional methods of managing and conducting Space Transportation System operations during the operational phase of the program. The team will obtain assistance from a yet-to-be-selected management consulting firm, and from several aerospace-oriented subcontractors. (Letter to: All KSC Civil Service Employees from Lee R. Scherer, Director, dated September 30, 1976.)

October 1976

**October 1:** NASA plans to launch an average of 19 space missions per year through 1981 from launch complexes at KSC (LC-39), ETR, and WTR. Between October 1, 1976, and December 31, 1981, 101 launches are scheduled, including several currently listed as tentative. Seventy-five will be unmanned missions from NASA complexes at Cape Canaveral and the Western Test Range in California. Twenty-six will be manned orbital Space Shuttle missions launched from the Center's Launch Complex 39. The first Shuttle flight from Complex 39 is scheduled in early 1979. Delta rockets will launch 35 spacecraft from Cape Canaveral and 11 from the Western Test Range. Atlas-Centaur launch vehicles are scheduled for 21 missions and Titan-Centaur vehicles for two, all from Cape Canaveral complexes. Atlas-F rockets will launch six missions from the Western Test Range. Seventy percent of the unmanned launches will be on a reimbursable basis, with NASA being paid for the cost of the launch vehicles and associated launch activities. Such launches are conducted for private business, other Federal agencies, other governments, and international agencies. Countries and international agencies involved in cooperative space projects are Brazil, Canada, Japan, Indonesia, Italy, a group of Arabic nations, NATO, the European Space Agency, and the International Telecommunications Organization. (NASA Fact Sheet, Release No. KSC 440-76, dated October 1, 1976.)

- o The NASA in-orbit engineering evaluation of NOAA-5 took place from the time of launch (July 29, 1976) until August 20, 1976. The check-out proceeded smoothly with no serious anomalies. The spacecraft was then turned over to NOAA for operational use. NASA's objectives, to launch NOAA-5 into an accurate sun-synchronous orbit, to conduct an in-orbit evaluation, and to turn the operational control over to NOAA, were achieved. (Mission Operations Report (MOR) No. E-601-76-17, dated October 1, 1976.)
- o During September, more than 42,734 persons took the guided tour of Kennedy Space Center and the Cape Canaveral Air Force Station. This represents an increase of 20.8 percent over the 35,382 figure posted for September 1975. During the first 9 months of 1976, 935,550 people have taken the tours. While this figure is 2.7 percent less than the same period in 1975, the tour totals for the year appear certain to top one million. Should this occur, it will be the fourth year, and the second in a row, that the one-million figure has been achieved since the program was started in 1966. (NASA News, Release No. 448-76, dated October 1, 1976.)

- o Janette Gervin of the Sciences, Technology, and Applications Office submitted a paper, titled: A Landsat Study of Water Quality in Lake Okeechobee, to the ACSM-ASP Fall Convention in Seattle, Washington. The paper reports on the use of multiple regression techniques to investigate the relationship between Landsat radiance values and water quality measurements. Michael Marshall, of the Central and Southern Florida Flood Control District, is the co-author of the paper and the co-investigator on the project. (Photogrammetric Engineering and Remote Sensing Journal of the American Society of Photogrammetry, Vol. XLII, No. 8, Falls Church, Virginia, August 1976.)

**October 7:** All communications equipment in the blockhouse at Launch Complex 37 has been removed, and the blockhouse has been turned over to Headquarters of the Air Force Eastern Test Range. Racks and consoles were left in place as part of the turnover plan. The Air Force is expected to donate them to educational institutions. Turnover of cryogenic tanks and other facilities will be accomplished by February 15, 1977. The blockhouse served as the launch control center for eight of NASA's Saturn 1 and 1B launches. (Notes: Clark, dated October 7, 1976.)

**October 11:** Viking 2 was successful in pushing a rock several inches away and scraping up a soil sample from where the rock had been situated. The soil was deposited in the hopper of the organic chemistry experiment in another search for signs of organic life. The sample was scheduled to go to the test oven on October 12. So far, Viking biologists have been unable to find any evidence of organic substances on Mars. (Defense/Space Business Daily, Vol. 88, No. 29, Wednesday, October 13, 1976, p. 227.)

**October 13:** NASA has awarded a contract for \$1,103,000 to Algernon Blair Industrial Contractors, Inc., of Norcross, Georgia, for construction of off-pad facilities at Launch Pad 39A. The 365-day contract calls for installation of Space Shuttle ground support equipment in the pad area including piping, cabling, and other equipment. The work includes the installation of new environmental control system cooling towers, new hypergol tanks, and piping. (NASA News, Release No. 450-76, dated October 15, 1976; also NASA Contract No. NAS 10-9047, dated October 13, 1976.)

**October 14:** KSC acquired a 50-foot gondola railcar from the Department of Defense excess property to be used as a safety spacer railcar. The spacer will be positioned between the railcar used to transport solid rocket motors and the locomotive during transfer operations from the storage area and the VAB. Use of the spacer will prevent the locomotive from entering the VAB during the transfer operations.

Costs to repair the excess rail car were \$612 compared to \$30,000 needed to acquire a new one. (Notes: Clark, dated October 14, 1976, and Gray, dated October 14, 1976.)

- o Marisat 3, the third maritime communications satellite, was successfully launched from Pad 17A, Eastern Test Range, by a Delta launch vehicle (Delta 127). Marisat 3 is to serve as an optional backup to Marisats 1 and 2 and was placed in a synchronous, equatorial orbit over the Indian Ocean. Initially, Marisat 3 will be used only by the Navy. At its altitude of 23,000 miles, the spacecraft can serve an area of about one-third of the earth's surface. Comsat General, which will reimburse NASA for the cost of the launch vehicle, launch services, and other administrative costs, arranged for all ground station support required for the launch and control of the spacecraft. (Defense/Space Business Daily, Vol. 88, No. 32, Monday, October 18, 1976, p. 251; also NASA Activities, Vol. 7, No. 11, dated November 1976, p. 5.)

October 19: General Alexei Leonov and Valeri Kubasov, cosmonauts on the Apollo-Soyuz mission in 1975, and a group of Soviet space scientists led by Dr. Boris Petrov, chairman of the Intercosmos Council, arrived at KSC, and a series of meetings were scheduled with NASA officials under the leadership of NASA Deputy Administrator, Dr. Alan Lovelace. The purpose of the meetings was to discuss possible future joint manned missions such as those that would involve the Space Shuttle and the Salyut. At the close of the meetings, Dr. Lovelace said that the earliest a joint mission could be scheduled was about 1981 or 1982. The Russians accepted this as reasonable. (Defense/Space Business Daily, Vol. 88 No. 32, Monday, October 18, 1976, p. 251; Defense/Space Business Daily, Vol. 88, No. 34, October 20, 1976, p. 266; and Defense/Space Business Daily, Vol. 88, No. 39 Thursday, October 28, 1976, pp. 305-306.)

- o Astronaut Donald Slayton predicts a joint flight of U.S. astronauts and Soviet cosmonauts will be sent to the surface of Mars by the end of the century. He said the spacecraft would be designed and built by the two countries. The trip would take 6 months each way, with a 1-year stay on the planet. (Defense/Space Business Daily, Vol. 88, No. 33, Tuesday, October 18, 1976, p. 260.)

October 21: The buildup of the basic Titan-Centaur (TC-6) for the Mariner-Jupiter-Saturn-B launch has been completed with the erection of the Centaur stage. Vehicle checkout is scheduled to begin November 3, by which time the ground support equipment will be completed and additional flight hardware components will have been received. (Notes, Kapryan, dated October 21, 1976.)

**October 25:** The surface sampler arm on Viking 2 successfully pushed a Martian rock and delivered a soil sample from the previously protected area to the biology experiment package. Preparations for the rock push were initiated on October 19. Two rocks were under consideration; one of them was in full view of the Viking 2 cameras. All three instruments in the biology package received samples of the material. (Aviation Week & Space Technology, Vol. 105, NO. 18, dated November 1, 1976, p. 15.)

**October 27-28:** The KSC Snorkle Unit arrived at the Dryden Flight Research Center. KSC fire personnel (NASA and Boeing) were on site for vehicle inspection, assembly, and training. Snorkle training started on October 28 and will continue through November 10, 1976. (Notes, Kapryan (to CD), dated November 4, 1976.)

**October 28-29:** The Model frustum built by KSC for parachute/frustum testing was completed in mid-October. The model frustum, which simulates the frustum of the Space Shuttle solid rocket motor, is being used to test solid rocket motor retrieval techniques and equipment. Frustum buoyancy tests were conducted in the LC-39 turning basin. On October 28, the model and parachutes were taken 4 to 5 miles offshore on board the Landing Craft Utility (LCU). Retrieval was practiced on parachutes and the frustum individually. The tests were conducted in winds gusting to over 30 knots and in seas of 3 to 5 feet. The results of the tests on the 28th indicated that over-the-stern retrieval of the frustum vs. over-the-side retrieval was the better method. Also, provisions must be made to give the parachute reel operator protection from being tossed overboard while operating the reel in rough seas. On October 29, the tests were resumed under similar sea conditions, but at 11 miles offshore. New problems were incurred. At 50 to 60 yards away, the frustum was not detected by the LCU's radar, set at its lowest range of 2 miles. In addition, the drift rate of the frustum/parachute was greater than anticipated. After modifications to the frustum are completed, testing will resume in November. (Notes (to CD), Gray, dated November 4, 1976.)

**During October:** Following the closing of the Bicentennial Exposition, work was started to restore large portions of the area to its original VAB parking area status. By the end of October, unwanted trees and bushes had been removed along with the ticket booths and souvenir stands; the restrooms were relocated to the Press Center; and dismantling of the domes was under way by Charter Industries workmen. In the VAB, all exhibits have been removed, and the Plastic Bubble was relocated to its previous position from where bus tour patrons were once again viewing the VAB. However, the Air Force X-24B, the NOAA buoy, and some of the Department of Transportation exhibits remained, but were scheduled for removal in November. (Notes, Donnelly, dated October 13, 19, 26, and November 2, 1976.)

- o NASA is taking a more detailed look at the feasibility of revisiting the Skylab space station, possibly as part of the sixth space shuttle mission. The purposes of the visit are to retrieve a materials sample pack and to attach a solid rocket motor pack to the space station to boost it into a higher orbit, giving it additional years of orbital life. There is some concern that when Skylab returns to the earth's atmosphere, parts of the vehicle will survive the reentry and impact on populated areas. (Aviation Week & Space Technology, Vol. 105, No. 16, dated October 18, 1976, p. 18.)
- o Democratic presidential candidate Jimmy Carter expressed support for the Space Shuttle program and a range of payloads that will be carried aboard the vehicle. In a letter to the American Institute of Aeronautics and Astronautics, Carter cited earth resources and satellite communications as priority areas. He said that NASA budgets would receive "close attention" under a Carter Administration. Carter also said, "Clearly this agency's expertise is needed in emergency civilian programs. One clear priority will be to maintain our clear pre-eminence as the undisputed leader in aerospace technology. To do this, we must have steady commitment to the aerospace professionals... Within limits, these skills are transferable to other domestic sections of technology. But the core of the profession must be held intact." (Aviation Week & Space Technology, Vol. 105, No. 17, dated October 25, 1976, "Washington Roundup," p. 11.)

November 1976

**November 1:** NASA/KSC awarded a \$29,158 contract to Bethune-Cookman College of Daytona Beach, Florida, to conduct a KSC Environmental Study with emphasis around the Shuttle Runway Area. The contract will also pay for a computer terminal and time-sharing system expenses incurred in the study. Vegetation and other types of ground cover were produced in character maps that were printed out on the computer terminal. Dr. P. Poonai and Dr. W. Floyd, both professors at Bethune-Cookman College, are the principal coinvestigators for this study. (SA-APP Project 20-73 file, November 1976.)

o NASA Tours volume in October was 50,840, a 16.4 percent gain over the same month in 1975. During October 1975, 43,674 patrons toured the Center. However, a 10-month comparison for 1975 and 1976 shows the 1976 tour volume at 2 percent below that of 1975. According to P.A. Fagnant, Chief, Visitors Services Branch, the increased patronage over the past 4 months indicates that the total 1976 figure will exceed the 1,168,189 figure of 1975. (NASA News, Release No. KSC 482-76, dated November 1, 1976.)

**November 2:** In the recent congressional elections, Senator Frank Moss of Utah, chairman of the Senate Committee on Aeronautical and Space Sciences, was defeated in his bid for reelection. In New Mexico, astronaut Dr. Harrison H. Schmitt joined John Glenn as the second astronaut to be elected to the United States Senate. In the House of Representatives, Rep. Olin Teague (of Texas), Chairman of the House Committee on Science & Technology, and Rep. Don Fuqua (of Florida), Chairman of the House Subcommittee of Space Science and Applications of the House Committee on Science and Technology, won their bids for election. (Defense/Space Business Daily, Vol. 89, No. 4, Thursday, November 4, 1976, pp. 19-20.)

**November 3:** The payload for the third flight test of the Space Shuttle will include, among other experiments, the Long Duration Exposure Facility (LDEF) which will be left in orbit for pickup on a later flight, the Induced Environmental Contamination Monitor (IECM) which will be used to study gaseous and particulate contaminates in and around the Orbiter while in orbit, and a free-flying maneuverable TV system which will be used for closeup inspection of the LDEF and for investigating the effects of the Orbiter's maneuvering engines on small payloads. (Defense/Space Business Daily, Vol. 89, No. 3, Wednesday, November 3, 1976, p. 19.)

**November 4:** Five KSC employees, two KSC groups, and three contractors received NASA awards during a NASA Headquarters ceremony in Washington today. The awards were presented by NASA Administrator Dr. James C. Fletcher. William M. Lohse, KSC's Director, Procurement, Supply and Transportation, received the Distinguished Service Medal, NASA's highest award. He was cited for "exceptional contributions to KSC and NASA in providing outstanding management of all Shuttle Program contracting requirements at the Center, his resolution of Bicentennial Exposition contracting problems, and his exceptional contributions in overall Center administrative management matters." Receiving NASA's Exceptional Service Medal were James F. (Frank) Burke, Wesley H. Dean, and Darrow L. Webb. Burke, Chief of the Management Support Office, Directorate of Design Engineering, was honored for his leadership in the management of the directorate's resources; and Dean, Chief of the Cost and Pricing Staff of the KSC Procurement Office, was cited for his contributions to the formulation of NASA policy in the areas of cost and pricing of procurement actions. Webb is project engineer for KSC's Shuttle Launch Processing System solid rocket booster system. The award was in recognition of his role in the technical integration of Launch Processing System hardware and software. Fernando Esparza received NASA's Equal Employment Opportunity Award in recognition of his role in KSC's recruitment of minority personnel. He is a supervisory mathematician in the Engineering Applications Branch of KSC's Information Systems Directorate and also serves as the Center's Spanish Speaking Program Coordinator. The Radio Frequency Operations Section of the Telemetric Systems Division, Information Systems, was presented a NASA Group Achievement Award. The group was cited for "outstanding technical achievements in providing payload and booster off-the-air data link quality measurements and launch related in-flight telemetry data acquisition to the Expendable Vehicle Directorate's mission operations." Supervisor Raymond N. Summy, Jr., accepted the award. A NASA Group Achievement Award was also presented to the Visitors Information Center Support Unit of the Laboratories Branch, Support Operations. The award cited continuous and dedicated effort ensuring that exhibits in the visitors center are maintained in a manner reflecting credit on KSC. Supervisor Bernard W. Torrence accepted the award. Stearns-Roger, Inc., Denver, Colo., an Air Force contractor, was presented a NASA Public Service Group Achievement Award for its accomplishments in restoring Complex 41, Cape Canaveral, following fire damage resulting from the second Viking launch, to meet the deadline for the launch of Helios-B on January 15, 1976. Greiner Engineering Sciences, Inc., Tampa, Fla., KSC's architect-engineer contractor for Phase I of the Shuttle Orbiter Landing Facility, received a NASA Public Service Group Achievement Award recognizing the company's performance in development of the design package and expertise in construction inspection and engineering services. Morrison-Knudsen Company, Inc., Darien, Conn., KSC's construction contractor for Phase I of the Orbiter Landing Facility, received a NASA Public Service Group Achievement Award for its exemplary performance and timeliness in managing and constructing the facility. (NASA News, Release No. KSC 481-76, dated November 4, 1976.)

**November 5:** NASA awarded a \$284,900 construction contract, Contract NAS 10-9067, to Norflor Construction Corporation, Orlando, Fla. The contract calls for the installation of an airlock in NASA's Spin Test Facility at Cape Canaveral Air Force Station to provide a clean-room environment for the prelaunch preparation of spacecraft. The 50-foot by 34-foot by 45-foot high airlock installation will include a 5-ton bridge crane, air conditioning, high efficiency particle accumulator, roll-up door, personnel airlock, and electrical, vacuum, compressed air, and gaseous nitrogen lines. Construction is to be completed within 160 days after the contractor's notification to proceed. The new clean room will be the site for preparation of future Delta-launched spacecraft, and later it will be used for Space Shuttle payload processing. Utilization of the new facility will begin immediately upon completion of construction. A number of Delta-launched spacecraft will be processed there during the spring and summer of 1977 while present clean-room installations are occupied by elements of two Mariner-Jupiter-Saturn spacecraft undergoing preparations for launches scheduled in August and September. Spacecraft scheduled for preparation in the Spin Test Facility clean room during the spring and summer are GEOS, an European Space Agency (ESA) geodynamic experimental ocean satellite, scheduled for launch in April, 1977; a geostationary operational environmental satellite (GOES), scheduled for launch in May; OTS, an ESA orbital test satellite, scheduled for launch in June; Japan/GMS, a Japanese meteorology satellite, scheduled for a July launch; SIRIO, an Italian communications research satellite, scheduled for launch in August; and METEOSAT, an ESA meteorology satellite, scheduled for launch in September. (NASA News, Release No. KCS 490-76, dated November 5, 1976.)

**November 10:** The one-millionth 1976 NASA tour patron purchased a ticket for an escorted bus tour of KSC and Cape Canaveral Air Force Station. This makes the seventh time in the 8 years of tour operation that one million or more people have toured the facilities. This year's millionth ticket was purchased by James Price of Elmhurst, Illinois, who was accompanied by his wife and three daughters. (NASA News, Release No. KSC 491-76, dated November 10, 1976.)

**November 17:** More than 600,000 people attended the U.S. Bicentennial Exposition on Science and Technology at Kennedy Space Center during its 100 days of operation. This figure was well below the three million visitor potential considered possible by the original planners, and the one million expected to attend the exposition. (NASA News, Release No. KSC 493-76, dated November 17, 1976; and Preliminary Concept, U.S. Bicentennial Exposition of Science and Technology, prepared by the Office of John R. Stiles, the White House, dated July 10, 1975, p. 12.)

- o The largest rocket propulsion test ever conducted in Europe was carried out by the Societe De Propulsion at Vernon, France, with the firing of all four engines of the first stage of the European Space Agency's Ariane space vehicle. The initial launch of the three-stage vehicle is scheduled for June 1979, followed by three additional development flights in 1980. (Defense/Space Business Daily, Vol. 89, No. 19, Monday, November 29, 1976, p. 145.)

**November 18:** NASA awarded a supplemental contract for \$2,635,053 to the Martin-Marietta Corporation's Michoud Operations, New Orleans, Louisiana. The contract extends through March 31, 1980, and is for the maintenance and operation of the liquid oxygen and liquid hydrogen storage and transfer system at KSC's Launch Complex 39. The supplemental agreement and previously awarded contracts for Shuttle external tank launch processing support brings the aggregate value of the awards to \$13,387,873. Both liquid oxygen and liquid hydrogen are propellants used by the Space Shuttle Orbiter's three main engines from liftoff to just prior to attaining orbital velocity. The two propellants are carried in a huge external tank carried beneath the orbiter's belly and flanked by twin solid rocket motors which are also ignited at liftoff. The existing storage and transfer facilities which were used to fuel the upper stages of the Saturn V and the Saturn IB are being refurbished to service the Space Shuttle, scheduled for launch on its first orbital mission in 1979. (NASA News, Release No. KSC 494-76, dated November 18, 1976.)

**November 22:** Harold Zweigbaum, Technical Assistant to the Director of Expendable Vehicles, has been named chairman of the Ground Support Equipment Panel, which is associated with the Low Cost Systems Office at NASA Headquarters. In his new assignment, Zweigbaum will be serving as the fulltime chairman of a NASA-wide panel with an aim of effecting the standardization of ground support equipment throughout the agency. The new assignment is effective immediately. According to Zweigbaum, the panel's charter extends to the investigation of all checkout and launch-related ground support equipment. Other NASA centers are involved, as they also design ground support equipment. Much airborne equipment - tape recorders are a prime example - has already been standardized to help reduce costs. (NASA News, Release No. 495-76, dated November 22, 1976.)

**November 23:** A recommended KSC in-house lightning research program for 1977 was presented to the Center Director, and approved. The KSC lightning research budget for 1977, including TRIP 77 support, was \$475,000. (Ref: Exec Comm #789 of November 29, 1976.)

**November 29:** The property accountability for the Mobile Service Structure (MSS) was transferred from KSC's Master Planning and Real Property Branch to KSC's Supply Branch to be processed as excess. MSS equipment to be retained for Shuttle use will be removed from the structure; the remaining items will be turned over to GSA for distribution and/or sale. The value placed on the MSS was \$25.1 million. (Notes (to CD), Malaga, dated December 9, 1976.)

**During November:** Negotiations have been completed with New Mexico State University for research and development plus technical operations support services for the Spacecraft Laboratory and Telemetry Station at the KSC Western Launch Operations Division. The \$539,630 contract covers work to be performed from December 2, 1976, through December 1, 1978. (Notes (to CD), Malaga, dated November 4, 1976.)

- o Whether or not there is life on Mars still remains a mystery. After 3 months above, on, and in the surface of Mars by two Viking landers and two orbiters, project scientists are still at a loss in interpreting their findings. Dr. Harold Klain, chief biologist, summed it up: "Putting the facts all together, they do not rigorously prove the presence of life on Mars and they do not rigorously disprove the presence of life on Mars." (Defense/Space Business Daily, Vol. 89, No. 9, Thursday, November 11, 1976, p.65.)
- o KSC was notified that modifications to LC-39B for Space Shuttle operations would have to be funded over a 2-fiscal-year period. Of the \$45 million requested in the FY 78 C of F, a maximum of \$31 million will be available. As a result, KSC personnel have been working with the Headquarters Office of Facilities to develop a design and construction schedule to comply with the Headquarters decision. The prepared funding schedule calls for an expenditure of \$27 million the first year and provides for all site preparation, construction of the Shuttle Service and Access Tower, all flame deflectors, and the sound suppression water system. Second-year funding would cover the Pay-load Changeout Room and the launch system. (Notes (to CD), Gray, dated November 18, 1976.)

NASA has received more than 600 applications from civilians seeking new astronaut positions. About 60 of the applicants were women. NASA will continue to accept applications until June 30, 1977. There are 15 openings for Space Shuttle pilots and 15 for Shuttle mission specialist positions. (Aviation Week & Space Technology, "Industry Observer," Vol. 105, No. 21, dated November 22, 1976, p. 9.)

- o KSC is soliciting bids for architectural engineering services for design and modifications for LC-39B to convert it from the Apollo to the Space Shuttle program configuration. Estimated costs for the conversion range from 30 to 40 million dollars. Work will include Service and Access Towers, deflectors, Payload Changeout Room, and mechanical and electrical systems. (Defense/Space Business Daily, Vol. 89, No. 17, Thursday, November 23, 1976, p. 131.)
- o Professor Massimo Trella, Technical Inspector of European Space Agency, told an international conference that European nations have the capability to provide complete space systems and should use that capability, both to compete with the United States for future space projects and to participate in cooperative global space undertakings. (Defense/Space Business Daily, Vol. 89, No. 19, Monday, November 29, 1976, p. 148.)
- o The European Space Agency has approved a launch schedule and payload for the four development flights of the Ariane space vehicle. The flights are scheduled for June 1979, December 1979, May 1980, and October 1980. Among the approved payloads are an Am-Sat satellite provided by the German branch of the International Radio Amateur Satellite Organization, a GEOS qualification satellite of the Geosari project, an Indian communications satellite designed to continue the experiments under the Satellite Tele-communications Experiments Project, a flight prototype of the Canadian Telecommunications Satellite (CTS), and an identification model of the Italian Sirio Satellite. (Defense/Space Business Daily, Vol. 89, No. 20, Tuesday, November 30, 1976, p. 156.)

December 1976

**December 1:** NASA Tours volume in November was 56,003, exceeding the November 1975 total by 15 percent. November marked the fourth consecutive month of increased tour volume compared to 1975. The 1976 volume should exceed last year's and will be third highest since the tour program began in 1966. Patronage during 1972 was 1,389,042 and in 1973 was 1,264,321. While the year's volume probably will not reach the 1973 level, the year-end total will probably exceed the 1,168,189 of 1975. A new and dramatically enhanced tour program will be offered to accommodate a possible record number of visitors during the Christmas holiday period. The new tour, extending from mid-December through early January, includes popular attractions at 3rd Century America, including a re-creation of the Apollo 11 launch in the Launch Control Center's Firing Room 3 and an opportunity for a close-up inspection of the mammoth Apollo/Saturn V space vehicle on display near the Vehicle Assembly Building. Also offered on the Christmas tour will be a visit to the building where astronauts trained for missions to the Moon to view a newly developed lunar diorama. (NASA News, Release No. KSC 505-76, dated December 1976.)

**December 2:** NASA awarded the Engineering Systems Division of the Ford Machinery Corporation a contract to design, fabricate, and install the Payload Ground Handling Mechanism. Work performed under the \$1,314,765 contract is to be completed by June 1, 1978. (Notes 12-2-76, Clark. Also NASA Contract No. NAS 10-9073, dated December 2, 1976.)

**December 1 and 3:** On December 1, the historic gantry at Launch Complex 14 was toppled by explosives set by the 27th Engineer Battalion demolition team from Fort Bragg, North Carolina. Constructed in 1957, the complex was the launch site for 32 NASA and Air Force missions including the first four manned orbital launches in the Mercury-Atlas program. Two days later, on December 3, the gantry on Launch Complex 12 met a similar fate. Complex 12, also completed in 1957, was the launch site for 37 NASA and military missions including the nine Ranger and four Mariner missions. (Spaceport News, Vol. 15, No. 25, John F. Kennedy Space Center, December 10, 1976.)

**December 8:** W.R. Durrett reaffirmed KSC's invitation for TRIP 1977 research to the scientific community at the fall AGU annual meeting in San Francisco. The meteorology section of the AGU devoted 2 days to papers on TRIP 76 findings.

The TRIP 77 program was held at KSC as scheduled from June 15 through August 15, 1977. Compilation of the data is now going on. As in 1976, the research aircraft associated with the program (including KSC's own NASA 6 instrumented twin Beechcraft) supported all launches that occurred during their stay at KSC, gathering data and reporting upper air electric charge levels in real-time to the KSC meteorologists. This included both Viking launches in 1976 and will include both Voyager launches in 1977.

- o Program Directive No. 73, "Shuttle Orbital Flight Test Landing and Post Landing Operations Responsibilities," was approved. This Directive establishes the responsibilities of the Johnson and Kennedy Space Centers for Shuttle Orbiter landing and post-landing operations of the Orbiter flight test program. Accordingly, JSC will be lead center in the landing operations until the Orbiter's wheels stop; at that point through launch/liftoff, KSC will take over as lead center. (Notes (to CD), Gray, dated December 16, 1976.)
- o Awards for their roles in 3rd Century America, the nation's Bicentennial Exposition on Science and Technology, were presented to employees, employee groups, and supporting organizations by NASA Administrator Dr. James C. Fletcher during a ceremony at the Spaceport today. NASA Outstanding Leadership Medals were awarded to KSC Deputy Director Miles Ross, who was general manager of 3rd Century America, and Space Transportation System Processing Director Paul C. Donnelly, who served as Exposition Project Manager. NASA Exceptional Service Medals were presented to Paul C. Gauger, Jr., Design Engineering, who was Project Engineer for exposition site preparations; Joseph F. Malaga, KSC Director of Administration and Management Operations, for business management and institutional support; Charles T. Hollinshead, KSC Chief of Public Affairs, for his role in 3rd Century America public affairs and promotional activities; Ray E. Yost, Jr., deputy to the KSC Resources Management Officer, for establishment and operation of the exposition budgeting and accounting system; Sara Sheppard, KSC Awards Officer, who served as administrative assistant to the 3rd Century America project manager; William H. Schick, Chief of the Complex 39 Operations and Special Projects Office, 3rd Century America's chief project engineer; Billy H. Childers, Support Operations, Support Management Office, for his coordination of exposition support requirements; George E. Harrington, recently retired Chief of the Supply and Transportation Office, for his role in coordinating exposition logistics requirements; and Major James R. Craig, Jr., USAF, Air Force Eastern Test Range Director of Information, for his role as Department of Defense liaison officer for 3rd Century America. Robert D. Hays, Shuttle Engineering Directorate, 3rd Century America technical exhibits designer and installation supervisor, was also a medal recipient. On temporary duty at NASA's Dryden Research Center, Edwards, Calif., Hays was not present to accept the award. Group Achievement Awards were presented to:

--3rd Century America Administrative Support Team, accepted by James J. Summa, Procurement Office.

--3rd Century America Project Coordinators, accepted by James Devlin, Support Operations.

--3rd Century America Technical Staff, accepted by James J. Kubasko, Shuttle Payloads.

--3rd Century America Public Affairs Team, accepted by Michael W. Bishop, Visitors Services Branch.

--3rd Century America Facilities Acquisition Team, accepted by John K. Feussner, Institutional and Expendable Vehicles Project Engineering Office.

--3rd Century America Site and Exhibit Activation Team, accepted by Robert T. Creeden, Support Operations.

Harry B. Chambers, General Manager, NASA Tours Division, TWA Services, Inc., the prime contractor for facilities construction and concessionaire for operation of 3rd Century America; and Robert H. Clark, TWA's project manager for 3rd Century America, were recipients of NASA Public Service Awards. TWA Services, Inc., is KSC's concessionaire for The Visitors Information Center and NASA Tours operations. Receiving NASA Public Service Group Achievement Awards were:

--The Graphics Unit of the Boeing Company, for art services. The award was accepted by supervisor Richard Huffman.

--Stottler, Stagg and Associates, also doing business as Brevard Engineering Co., for its role as architect-engineering contractor for 3rd Century America. Brevard Engineering Co. president Richard A. Stottler, Jr., accepted the award.

--TWA Services, Inc., for management and operation of 3rd Century America. The award was accepted by J.J. Dillon, president, TWA Services, Inc., a subsidiary of the Canteen Corporation.

--Walt Disney World, for assistance in designing the 3rd Century America logo and the exposition promotional campaign. The award was accepted by Robert Matheison, vice president of operations (NASA News, Release No. KSC 502-76, dated December 8, 1976.)

**December 14:** Phase II construction of the Launch Equipment Test Facility (LETF) was completed. Phase I construction was completed in May. Closed loop testing of the LETF's hydraulic system is now under way. The primary purpose of this facility is to test and qualify launch critical ground support equipment prior to its installation and to retest and recertify equipment between launches, as necessary. The facility will also be used for development testing of conceptual ground support equipment design. (Schedules and Status Summary, Vol. 1, Space Shuttle, K-SM-03.1, dated January 31, 1977, p. 14; also K-SM-10.1.30, Revision 1, Section II, par. 2.1, dated June 11, 1976, p.3.)

- o No manned missions were conducted during the past year as the buildup continues for the Space Shuttle, but KSC's Expendable Vehicles Directorate conducted 13 unmanned launches during 1976. It was the first completely successful year since 1972. The launches included one Titan-Centaur, three Atlas-Centaur, and nine Delta rockets. Of the 13 missions, 11 were launched from KSC's facilities at Cape Canaveral and the remaining 2 from the Western Test Range in California. Only three of the spacecraft -- Helios 2, LAGEOS, and Communications Technology Satellite -- had developmental or scientific missions. The remaining 10 satellites were operational weather or communications spacecraft launched for paying customers. The 1976 mission total was 5 below the 18 launched in 1975, and the launch rate was materially below that of the 1960s. The number of KSC launches since 1958, when NASA was created, through 1975 is as follows: 1958--8, 1959--14, 1960--17, 1961--24, 1962--27, 1963--13, 1964--29, 1965--30, 1966--30, 1967--28, 1969--22, 1970--12, 1971--17, 1972--18, 1973--14, and 1974--10. (NASA News, Release No. KSC 511-76, dated December 14, 1976.)

**December 16:** Seventeen launches, including 11 Deltas, 4 Atlas-Centaurs, and 2 Titan-Centaurs, have been scheduled in 1977 by KSC's Expendable Vehicles Directorate. Ten of the Deltas will be launched from Complex 17, Cape Canaveral Air Force Station, and one from a KSC launch pad at the Western Test Range, Vandenberg Air Force Base, Calif. The four Atlas-Centaurs will be launched from Complex 36, Cape Canaveral, and the two Titan-Centaurs from Complex 41 on the Cape. Two possible callup missions, an ITOS meteorological satellite that would be launched from the Western Test Range, and RCA-C, which would be launched from Cape Canaveral, are also on the tentative 1977 schedule, as is a possible ESA/OTS backup, which would also be launched from the Cape. All would be launched on Deltas. (NASA News, Release No. KSC 492-76, dated December 16, 1976.)

**December 17:** Lee R. Scherer, Director of KSC, and Brigadier General Don M. Hartung, Commander of the Air Force Eastern Test Range, announced today that propellant functions and chemical sampling operations will

be consolidated in contracts serving both NASA's John F. Kennedy Space Center and the U.S. Air Force Eastern Test Range. The consolidation will be in effect no earlier than October 1977, and should result in substantial cost savings to the Government. Propellant functions include planning, logistics, operation and maintenance of mobile liquids and gases equipment, and the operation and maintenance of fixed pneumatics systems located at the two facilities. The annual savings to the Government to be achieved by the consolidation are estimated at \$1 million in 1978 and in excess of \$1 million in 1979 and succeeding years. In addition, consolidation will enable NASA and the Air Force to dispose of numerous propellant mobile equipment items which are very costly to maintain. The acquisition value of the equipment to be excessed is \$4.6 million, and the estimated 1977 replacement value is \$12.7 million. It is expected that the majority of this equipment will be picked up by other Government agencies, resulting in a significant cost avoidance for the Government. The propellants function will be consolidated under the KSC Ground Systems Operations contract on which bids have already been requested from industry in a recently issued Request for Proposal. Other support operations previously consolidated by the NASA and Air Force installations to help reduce costs include photographic, medical, timing and countdown, ordnance storage and handling, nondestructive testing evaluation, precision cleaning, electromagnetic compatibility, and frequency control analysis services. (NASA News, Release No. KSC 513-76, dated December 17, 1976.)

**December 18:** After 9 months of competitive negotiations, United Space Booster, Inc. (USBI), Sunnyvale, Ca., was selected as the assembly contractor for the Space Shuttle's solid rocket boosters. The cost-plus-award-fee contract totalling \$122 million is for six design, development, test, and evaluation flights, which extend through March 1980, plus options for 21 operational flights extending into 1982. USBI will be responsible to Marshall Space Flight Center for assembly, checkout, and refurbishment of the boosters; and they will be responsible to KSC for final assembly, stacking, integrated checkout, launch operations, and post launch disassembly of the boosters. McDonnell Douglas Astronautics Co., Huntington Beach, Ca., and Boeing Services International, Seattle, Wa., also were in competitive negotiations. (NASA News, Release No. 76-212, released December 21, 1976. Also, Today Newspaper, Saturday, December 19, 1976.)

**December 31:** At the close of 1976, the total value of KSC's real property and equipment was placed at \$1,472,146,411. Of this amount, the value placed on NASA's Cape Canaveral Air Force Station facilities is placed at \$60,270,311. KSC facilities are valued at \$625,828,304, including land. More than \$720 million are invested in Government-owned capital equipment. (NASA-KSC Quarterly Real Property Report as of December 31, 1976.)

APPENDIX A

KSC ORGANIZATION CHARTS

APRIL 1975 ..... A-1

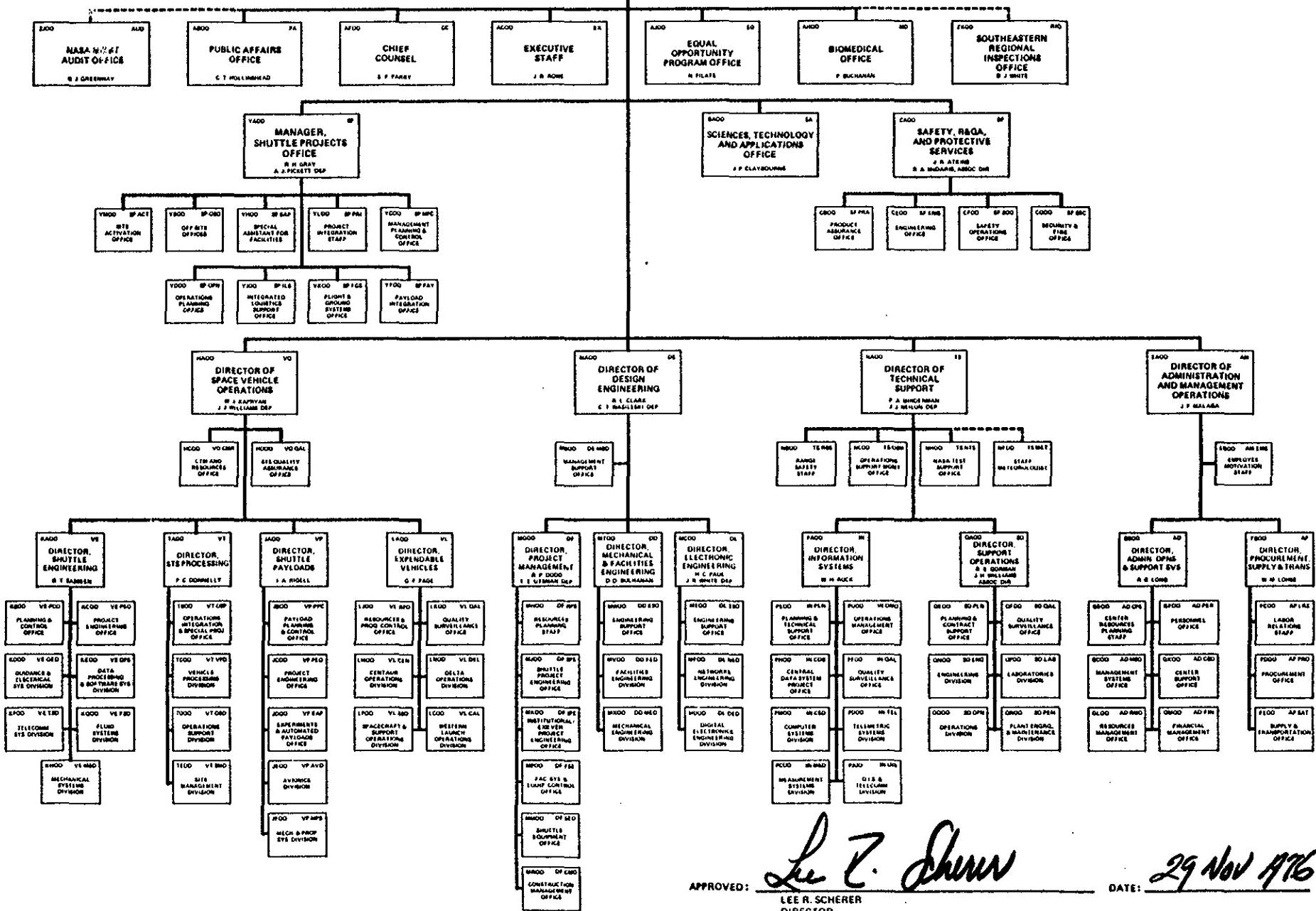
NOVEMBER 1976 ..... A-2

BICENTENNIAL CHART

FEBRUARY 1976 ..... A-3

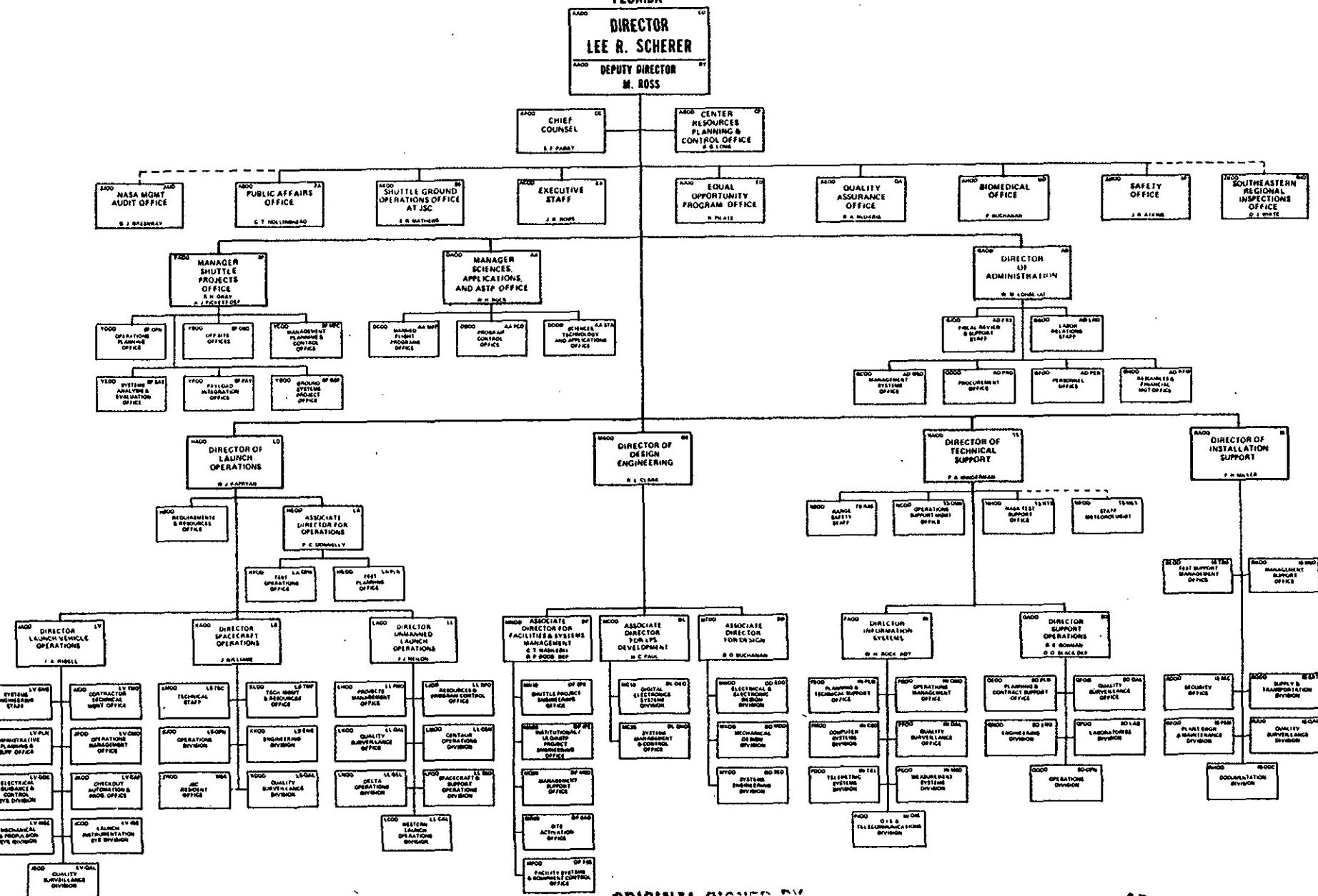
JOHNSON F. KENNEDY SPACE CENTER, NASA

**DIRECTOR**  
**LEE R. SCHERER**



# **JOHN F. KENNEDY SPACE CENTER, NASA**

**FLORIDA**

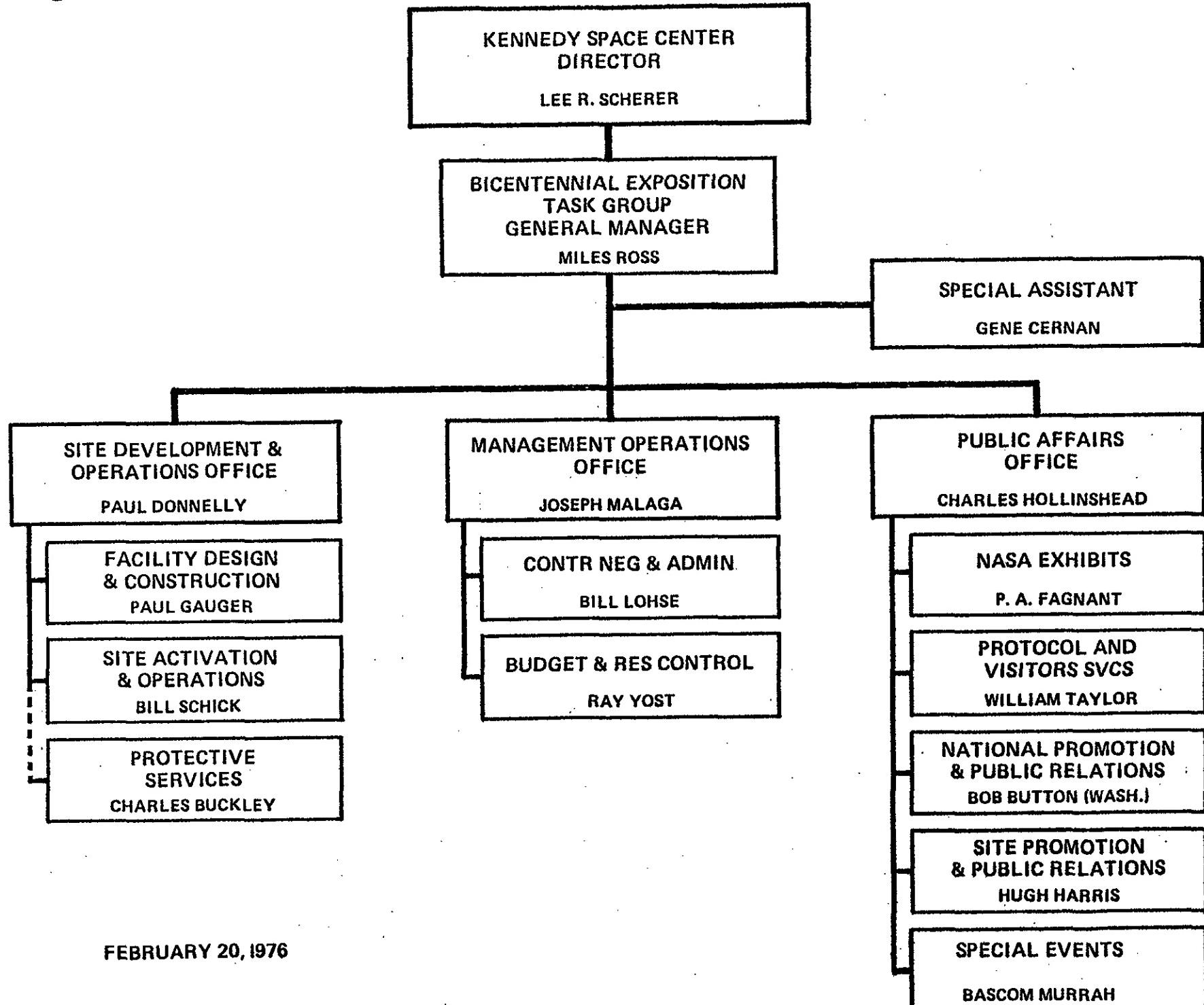


**ORIGINAL STORIES BY**

**ANSWER** \_\_\_\_\_  
1.0 g. sucrose  
1.0 ml. water

APR 9 1975

# U. S. BICENTENNIAL EXPOSITION ON SCIENCE AND TECHNOLOGY



**APPENDIX B**

**MAJOR NASA LAUNCHES**

**JANUARY THRU DECEMBER**

**1976**

**00000063**

## APPENDIX B

## MAJOR NASA LAUNCHES - JANUARY 1 - DECEMBER 31, 1976

<u>DATE</u>	<u>DESIGNATION</u>	<u>LAUNCH VEHICLE</u>	<u>SPACECRAFT</u>	<u>LAUNCH PAD</u>	<u>TEST NO.</u>	<u>RESULTS</u>
January 15 12:36 am EST	HELIOS-2	Titan-Centaur TC-5	HELIOS-B	41	2675	(S)
January 17 6:28 pm EST	CTS	Delta 119	CTS	17	2516	(S)
January 29 6:56 pm EST	INTELSAT IV-A F-2	Atlas-Centaur AC-37	INTELSAT IV-A	36B	4740	(S)
February 19 5:32 pm EST	MARISAT 1	Delta 120	MARISAT B	17B	4200	(S)
March 26 5:47 pm EST	RCA SATCOM-2	Delta 121	RCA-B	17A	3788	(S)
April 22 3:46 pm EST	NATO IIIA	Delta 122	NATO IIIA	17B	2190	(S)
May 4 4:00 am EDT	LAGEOS	Delta 123	LAGEOS	SLC -2W		(S)
May 13 6:28 pm EDT	COMSTAR A-1	Atlas Centaur AC-38	COMSTAR A-1	36A	2211	(S)

B-1

00000064

<u>DATE</u>	<u>DESIGNATION</u>	<u>LAUNCH VEHICLE</u>	<u>SPACECRAFT</u>	<u>LAUNCH PAD</u>	<u>TEST NO.</u>	<u>RESULTS</u>
June 9 8:09 pm EDT	MARISAT-B	Delta 124	MARISAT-2	17A	2030	(S)
July 8 7:31 pm EDT	PALAPA-1	Delta 125	PALAPA-A	17A	5660	(S)
July 22 6:04 pm EDT	COMSTAR-A-2	Atlas Centaur AC-40	COMSTAR A-2	36B	6909	(S)
July 29 1:07 pm EDT	NOAA-5	Delta 126	ITOS-E-2	SLC -2W		(S)
October 14 6:14 pm EDT	MARISAT -3	Delta 127	MARISAT-C	17A	6911	(S)

B-2

00000065